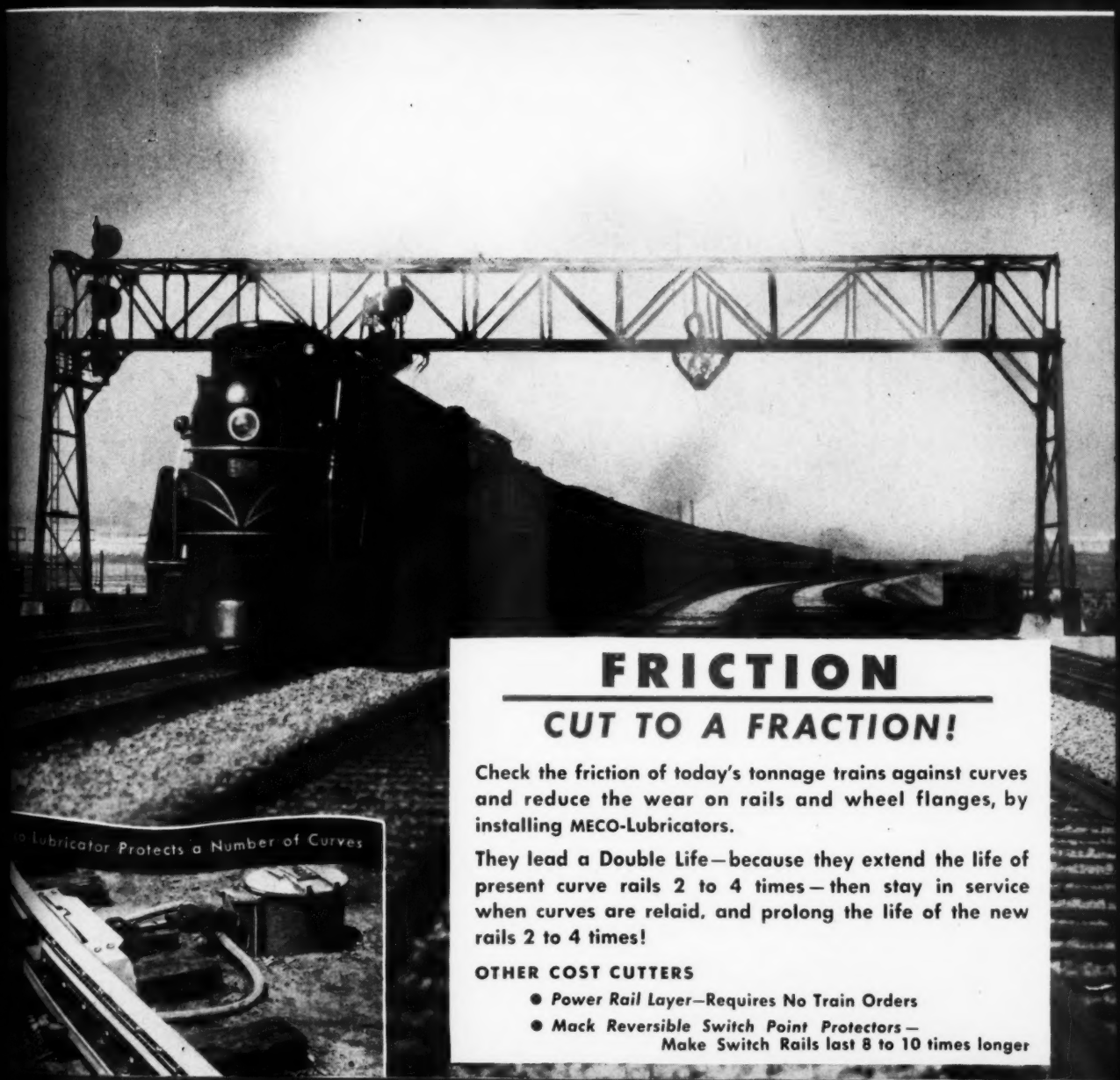
Railway Engineering and Maintenance



FRICTION

CUT TO A FRACTION!

Check the friction of today's tonnage trains against curves and reduce the wear on rails and wheel flanges, by installing MECO-Lubricators.

They lead a Double Life—because they extend the life of present curve rails 2 to 4 times—then stay in service when curves are relaid, and prolong the life of the new rails 2 to 4 times!

OTHER COST CUTTERS

- *Power Rail Layer*—Requires No Train Orders
- *Mack Reversible Switch Point Protectors*—Make Switch Rails last 8 to 10 times longer

Maintenance Equipment Company ★

RAILWAY EXCHANGE BUILDING · CHICAGO 4, ILLINOIS

It's a Long Road THAT HAS NO TURN

Edgemark *of Quality*

● Track stress is greatest at the curves. That's where better quality track fastenings show their stuff, standing the gaff and coming through successfully in the pinches.

● Reliance Hy-Crome Spring Washers are manufactured to definite specifications to meet tough service conditions like these. They conform to A.R.E.A. specifications . . . exceed them by a considerable safety margin. Every operation in their manufacture is carefully planned to provide the highest quality . . . to guarantee their satisfactory performance.

● Reliance Hy-Crome Spring Washers have proved their serviceability over the years and the consideration and use they have been accorded by the railroads indicates their acceptability.

● There is a Reliance Hy-Crome Track Spring Washer for every track fastening problem. Take that turn with safety; use Reliance Hy-Pressure Hy-Crome Spring Washers.

Reliance **HY-PRESSURE HY-CROME** *spring washers*

RELIANCE DIVISION
Offices and plant: MASSILLON, OHIO

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EATON
EATON MANUFACTURING COMPANY

16th Year of Proof

In 1931 Bethlehem introduced its first heat-treated bolted crossings—a type of construction designed to withstand higher speeds, heavier loads, and greater impacts. For years, under severe traffic, these crossings were brutally tested—and how they stood up!

Today hundreds of similar Bethlehem units are in heavy-duty service throughout the country. Sixteen years have proved our early conviction—that here was a better, more rugged, more durable type of crossing.

All component parts of a Bethlehem bolted crossing are forged or rolled steel. After machining, cutting, and assembly, the complete job is carefully heat-treated under precise electric-pyrometer temperature controls. Finally the unit is dismantled, sand-blasted to remove scale, and reassembled with high-tensile alloy bolts, specially treated to resist stretching.

The finished crossing is uniformly hard throughout the entire cross-section; a product unusually resistant to chipping, spalling, cracking, and wear.

Ask for further details. We'll be glad to work closely with you—to your own or A.R.E.A. specifications.

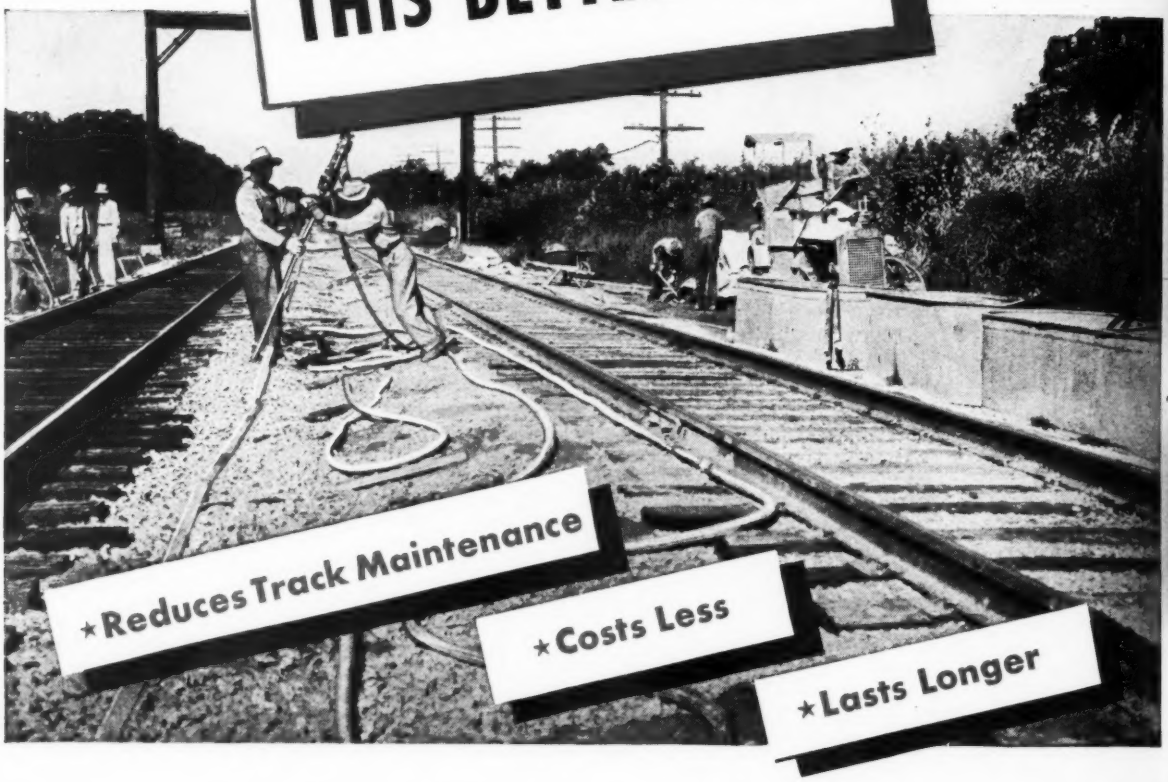
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

Four Bethlehem heat-treated, built-up crossings in main-line track. These installations are subject to unusually heavy impacts.

Published monthly by Simmons-Boardman Publishing Corporation, 105 W. Adams St., Chicago 3, Ill. Subscription price: United States and Possessions, and Canada, $2.00 for one year; $3.00 for two years. Single copies 50 cents. Entered as second-class matter January 20, 1933, at the post office at Chicago, Ill., under the act of March 3, 1879, with additional entry at Mount Morris, Ill., post office. Address communications to 105 W. Adams St., Chicago 3, Ill.

STABILIZE ROADBED THIS BETTER WAY

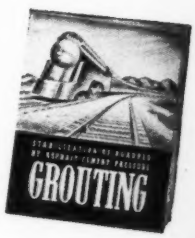


ASPHALT-CEMENT pressure grouting is the easy, low cost, lastingly effective method of roadbed stabilization being used by more and more railroads. When the grout is prepared with *Texaco No. 24 Emulsified Asphalt* — developed specifically for this work—many special advantages accrue.

With *Texaco No. 24 Emulsified Asphalt* you can, for example, use leaner mixtures for easier flow, more thorough penetration, better seal, and greater economy. The pure asphalt released also helps waterproof the soil and keep it stable, yet resilient.

In addition to doing a better job of stabilization, Texaco asphalt-cement pressure grouting lasts longer . . . it can be applied quickly and easily . . . and it makes possible continuing large savings in maintenance that quickly return its remarkably low first cost.

The booklet illustrated at the right gives full details. Get your copy from the nearest Railway Sales Division office listed below, or write The Texas Company, *Railway Sales Division,* 135 East 42nd Street, New York 17, N. Y.



SEND FOR this fact-packed, 16-page, illustrated book. Describes the development of asphalt-cement pressure grouting, outlines a practical working set-up, shows costs, tells benefits secured by a leading railroad.

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TEXACO Emulsified Asphalt
FOR GROUTING

Tune in . . . TEXACO STAR THEATRE presents the NEW TONY MARTIN SHOW every Sunday night. See newspaper for time and station.

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ATLANTIC COAST LINE · VIRGINIA · NORTH CAROLINA · SOUTH CAROLINA · GEORGIA · FLORIDA · ALABAMA

ANOTHER Class I Railroad joins the long list of leading American lines to become a repeat order owner of Northwest equipment.

They have proved that a Northwest does things no track type machine can do. It works wherever you want it to — on the line . . . off the line . . . or from the car. It unloads and loads itself under its own power either on a standard flatcar or on a heavy duty trailer, making transportation to any point on the line an easy matter.

The Northwest Crawler Shovel or Crane is a real railway man's machine. You can profit by its versatility. Let us send you details.

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Proved on the Nation's Leading Railways

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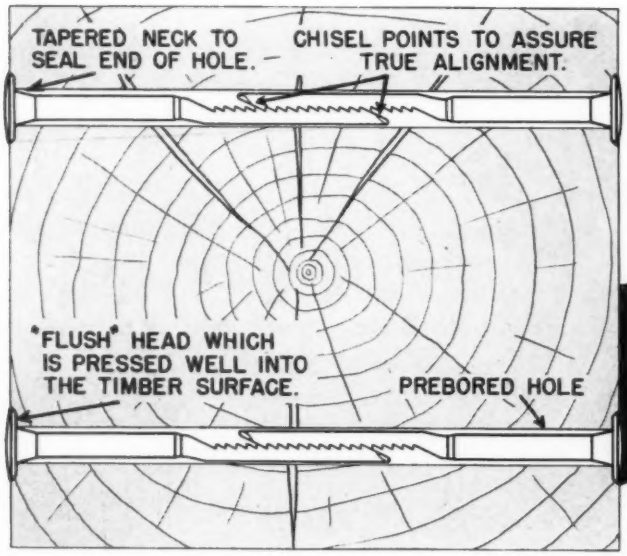
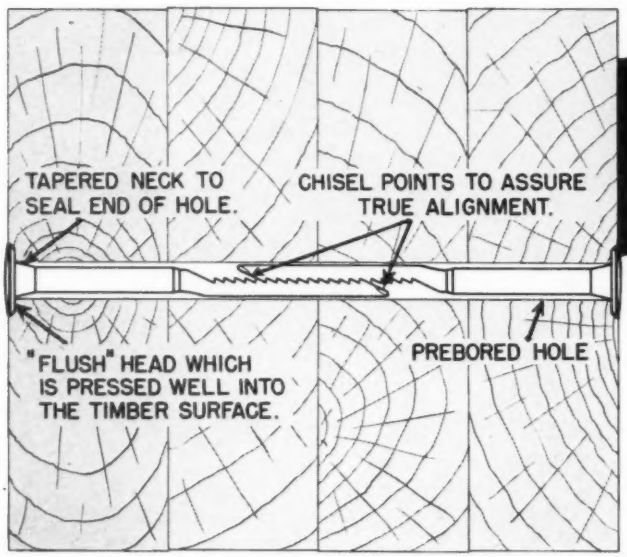
THE ALL PURPOSE RAILROAD MACHINE
SHOVEL • CRANE • DRAGLINE • PULLSHOVEL


TAPERED NECK TO SEAL END OF HOLE.
CHISEL POINTS TO ASSURE TRUE ALIGNMENT.
"FLUSH" HEAD WHICH IS PRESSED WELL INTO THE TIMBER SURFACE.
PREBORED HOLE

—for prolonging the life of split ties . . .


TAPERED NECK TO SEAL END OF HOLE.
CHISEL POINTS TO ASSURE TRUE ALIGNMENT.
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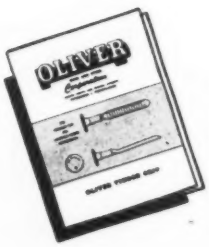
PREBORED HOLE

—for fastening timbers in laminated construction . . .

The OLIVER TIMBER GRIP

The simplicity and effectiveness of the Oliver Timber Grip instantly appeals to the railroad man. We will gladly discuss with you how effectively you can use it to prevent or minimize tie splitting—or to fasten together the component timbers used in laminated construction.



WRITE FOR BULLETIN
giving complete details of
the Oliver Timber Grip.

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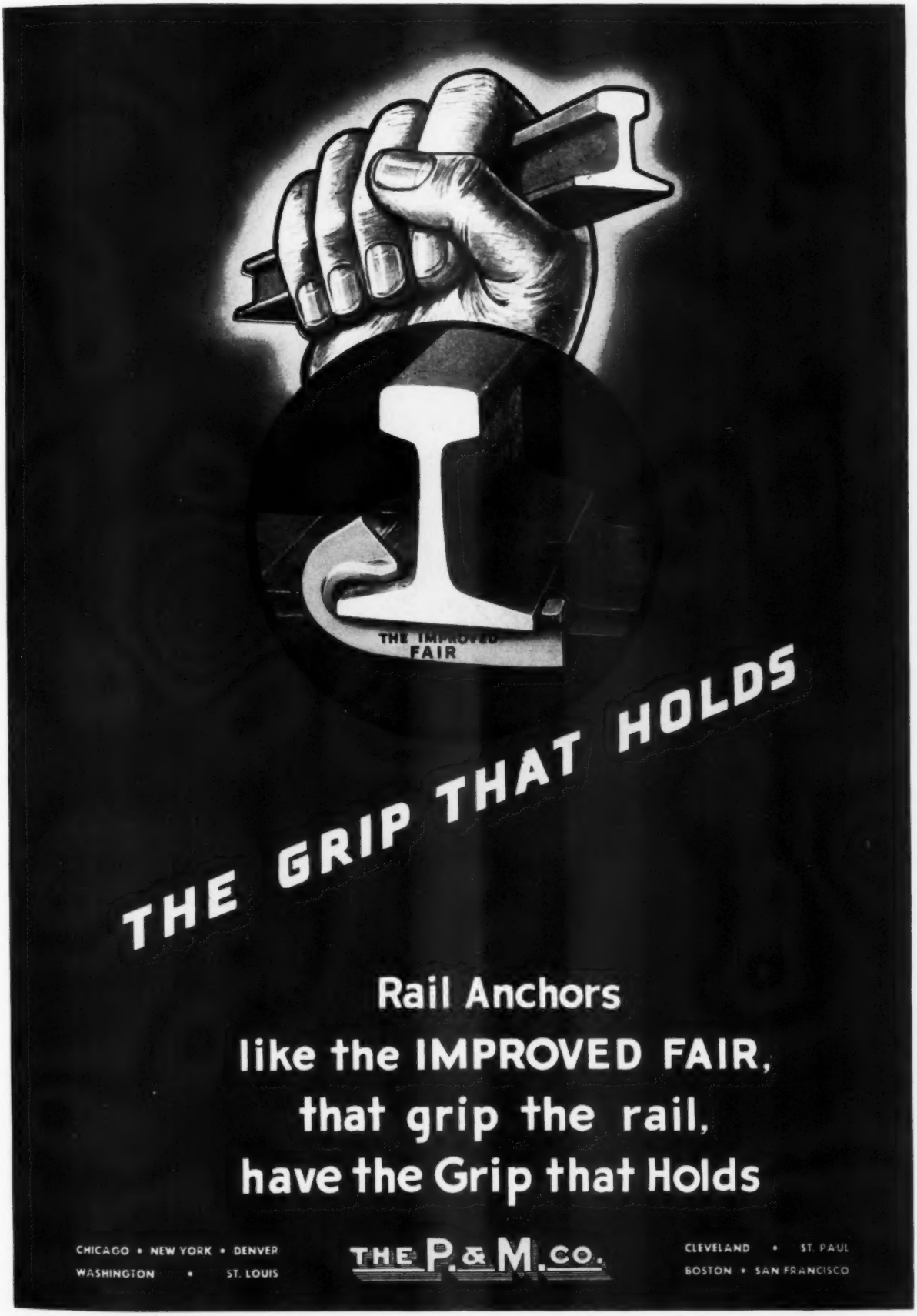
IRON AND STEEL
Corporation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Rail Anchors
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that grip the rail,
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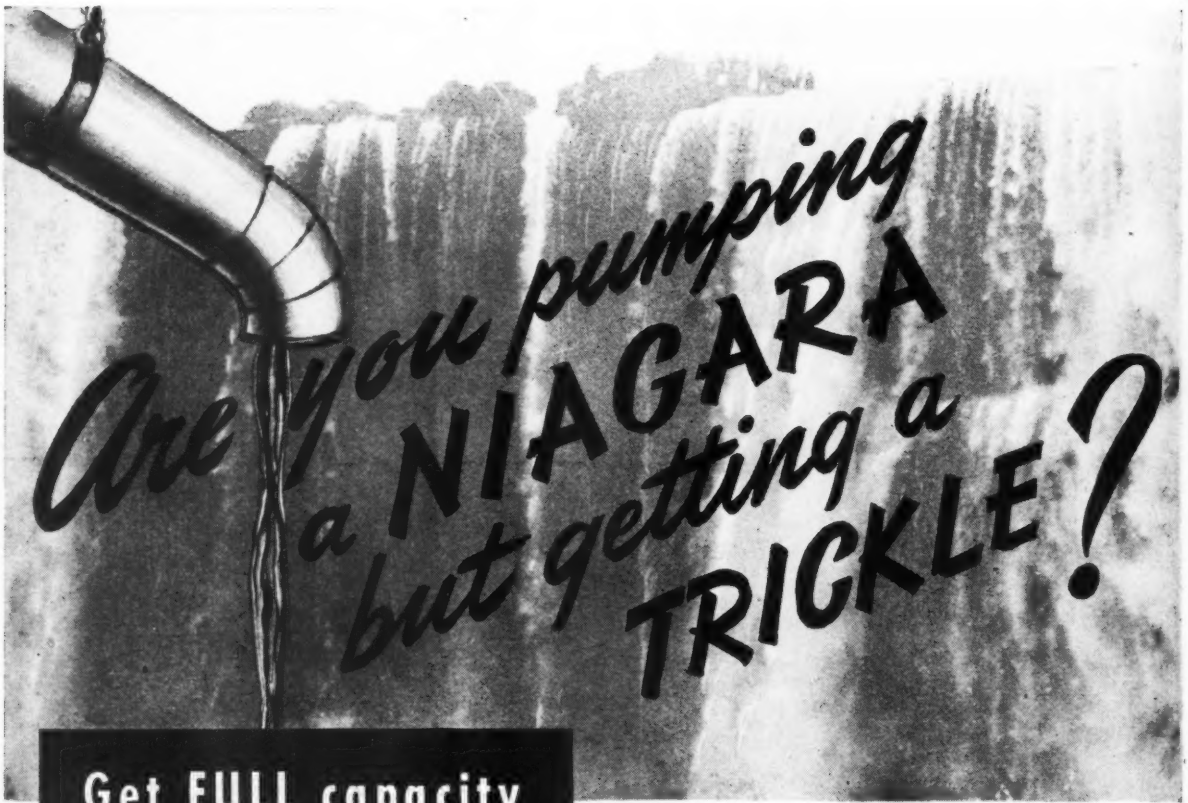
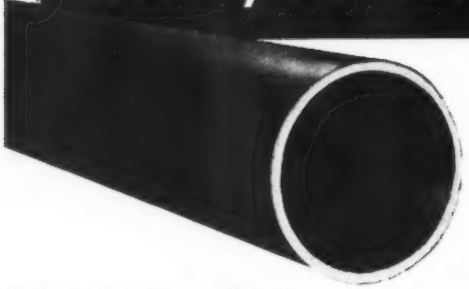


Get FULL capacity with less pumping pressure — let PITTSBURGH clean your mains



Water supply mains reconditioned by Pittsburgh-Eric Process show a minimum of tuberculation and incrustation after more than ten years of service.

NO MATTER how hard you may force a pump, the result is the same! If water supply lines are clogged, incrustated and tuberculated, you just can't expect real water service efficiency because carrying capacity is limited. Consequently, operational costs go up.

But when water lines have been cleaned and lined by the PITTSBURGH-ERIC PROCESS, the results are different. Not only can small lines be cleaned and ALL OBSTRUCTIONS removed, but they can now be lined by the PITTSBURGH-ERIC PROCESS which applies an enduring coating of Elecromin to the pipe interior. Maximum capacity and useful life of water supply lines can thus be extended many years at a fraction of the cost of replacement.

To assure the utmost in water servicing on the main line and in the yards, ask our nearest branch in your district for full details about the PITTSBURGH-ERIC PROCESS of pipe reconditioning.

Pittsburgh Pipe Cleaner Company is an integrated engineering and operating organization specializing in the cleaning of water supply lines and sewers of all kinds. Our engineering service division is ready at all times to give you the benefit of our experience in overcoming railroad water supply and drainage problems everywhere.

PITTSBURGH PIPE CLEANING COMPANY

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For additional information, use postcard, pages 545-546

Pound for Pound, Inch for Inch...

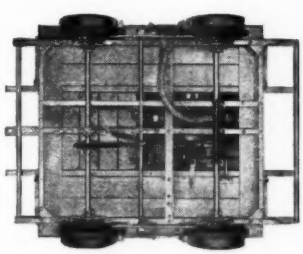
It's Built for Service!

So *sturdy* that it carries an 8-man gang with tools in complete safety—so *light* that one man can easily handle it—this is the Fairbanks-Morse No. 53 Motor Car.

It weighs only 930 lbs.; its rear end lifting weight is but 130 lbs. Chain driven, it is powered by a dependable 8- to 13-hp. motor.

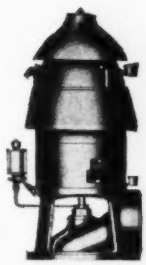
It offers proved reliability, serviceability, and operating economy—as do all motor cars in the complete Fairbanks-Morse line. Write for full particulars about the motor cars that are, and always will be, built for service.

Fairbanks, Morse & Co., Chicago 5, Ill.

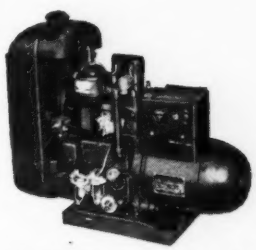


Under side of No. 53 Motor Car, showing transmission assembly.

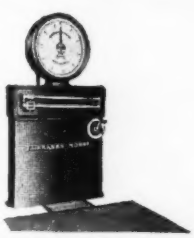
Fairbanks-Morse Demountable-Hub Steel Wheels—for all motor car requirements.



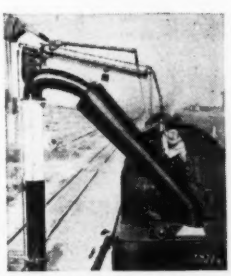
Fairbanks-Morse Pumps—a full line of complete pumping units for every need.



Fairbanks-Morse Generating Sets—one for every requirement.



Fairbanks-Morse Scales—Every type and capacity, including platform scales, pictured.



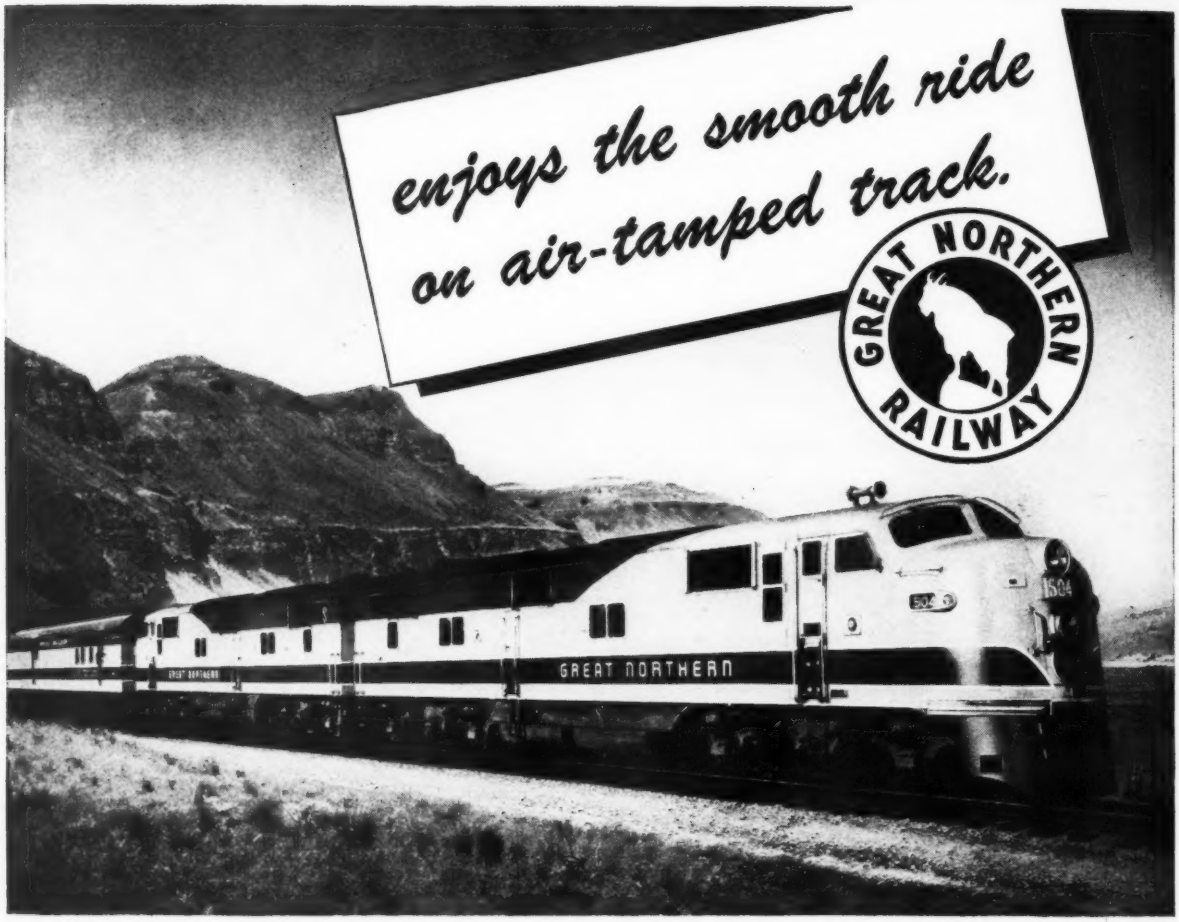
Fairbanks-Morse Railroad Standpipes.

Fairbanks-Morse

A name worth remembering

Diesel Locomotives • Magnetos Diesel Engines • Scales • Pumps Generators • Farm Equipment Motors • Stokers • Railroad Motor Cars and Standpipes

GREAT NORTHERN LUXURY TRAIN



The smooth ride you get on the Great Northern is the result of a well-planned and executed track maintenance program.

Naturally, tie tamping is one of the most important and basic operations. On the Great Northern system, air-operated tie tampers are widely used because they produce a uniform tamping job in the shortest time. Section gangs prefer them because they are so light—the men simply guide the tool and let the machine do the work that is so necessary toward a smooth-riding track.

To supply the air power for tie tampers and other track maintenance tools, we offer a full line of off- and on-track air compressors.

AIR TOOLS
COMPRESSORS
CONDENSERS
ROCK DRILLS
TURBO BLOWERS
CENTRIFUGAL PUMPS
OIL & GAS ENGINES

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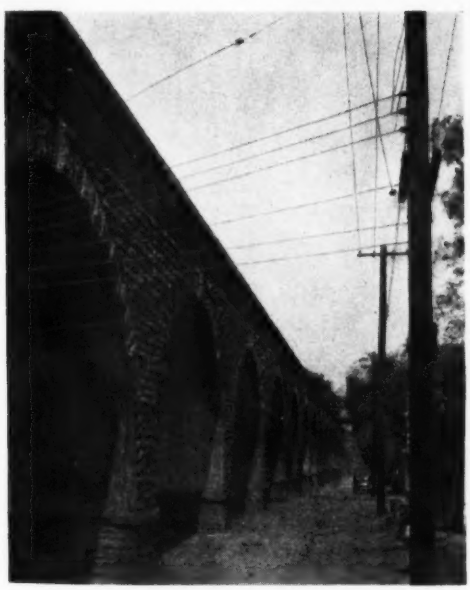
ORIGINATOR OF MECHANICAL TAMPING

For additional information, use postcard, pages 545-546

EMBECO Repairs Gave 700 Foot Bridge "New Lease On Life"



Non-Shrink Embeco used throughout in repairs on this 700 foot railroad bridge in Hamilton, Ohio. Disintegrated concrete in parapets cut out and replaced with gunite; sides and top of arches pressure grouted; arches lined with 2" gunite; balance of stone work tuck-pointed. After two years heavy vibration from down-grade braking of trains, repairs are in excellent condition. One of many Embeco repair jobs done by George E. Detzel Co., Cincinnati, Ohio, Restoration Contractors.

Railway properties, such as this 17 arch bridge, are being brought up to the requirements for safe, adequate and modernized transportation by the Embeco Non-Shrink Method.

Eliminating all shrinkage in mortar and grout, Embeco is used widely and successfully for grouting bridge, turntable and heavy machinery bed plates, repointing old stone structures, reintegration of concrete masonry piers and abutments and the application of gunned concrete for tunnel lining, repairing retaining walls, dams, abutments and piers.

Fill in and mail coupon below for full information on the Embeco Non-Shrink Method.

THE MASTER BUILDERS CO.
7016 Euclid Ave., Cleveland 3, Ohio

Please send me full information on the Embeco Non-Shrink Method for concrete reintegration and grouting.

Name.....

Company.....

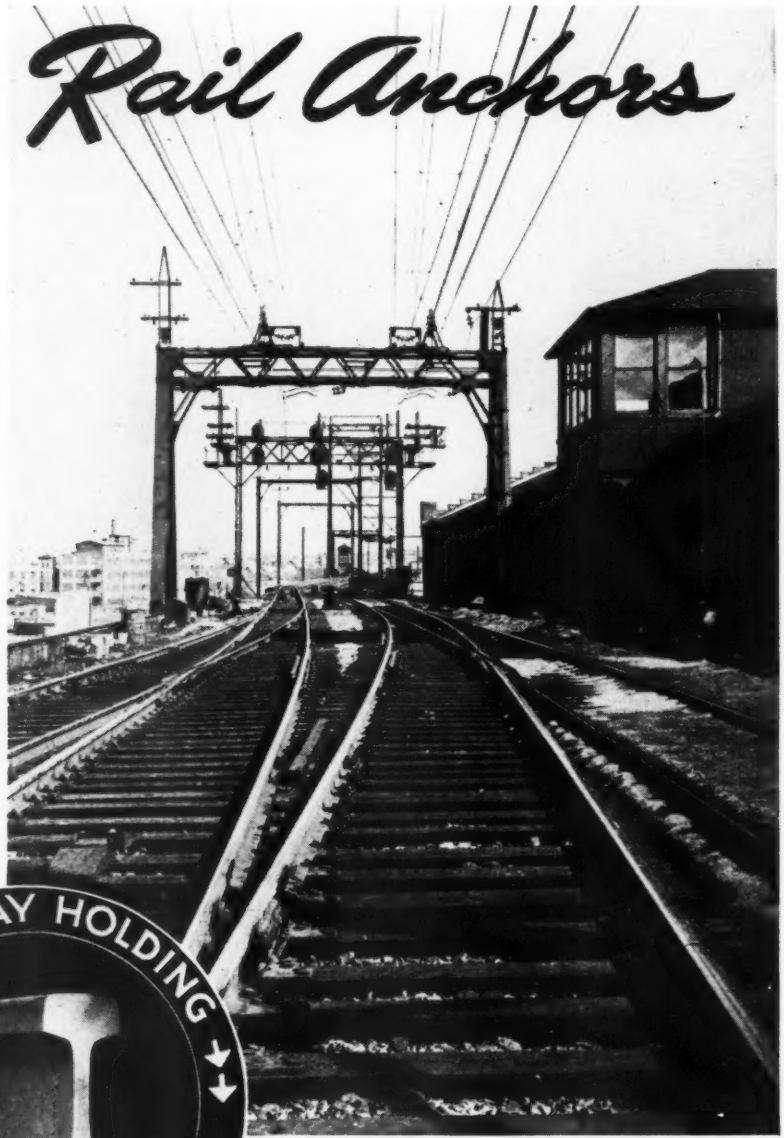
Address.....

the MASTER BUILDERS Co

CLEVELAND 3, OHIO TORONTO, ONTARIO

COMPRESSION

Rail Anchors



Trouble-free interlocking calls for closely-held rail. Compression Anchor *two-way holding* keeps these vital plants functioning at their best.

THE RAILS COMPANY

General Office
178 GOFFE STREET, NEW HAVEN 11, CONN.

ST. LOUIS, MO. HOBOKEN, N. J. CHICAGO, ILL.

Reclaiming Tamper Bars

with the oxyacetylene flame or electric arc

Airco oxyacetylene flame and electric arc welding apparatus is now a part of many railroad repair and maintenance shops. Both are gaining industry-wide acceptance as time and material savers in repair, maintenance, and fabrication for new construction and equipment.

For example, the illustration shows worn tamper bars being reclaimed by oxyacetylene welding. The welder is using an Airco RR rod to rebuild the bar to proper width, thickness and length. These bars can also be reclaimed by use of the electric arc. A ½ inch reinforcing rod is arc welded to the bar using an Airco 78E electrode and the entire surface is covered with a thin coat of Stoody Self-Hardening material. This reclamation, done at small cost, extends the service life considerably.

This is just one of the many uses to which American railroads are putting these two modern Airco processes to cut costs and keep equipment rolling in top working order.

For more information about the utilization of these two versatile processes for railroad applications, write for the 32-page book "Efficient Maintenance-of-Way Operations with the Oxyacetylene Flame and Arc Welding". Address: Dept. REM 6121, Air Reduction, 60 E. 42nd St., New York 17, N. Y. In Texas: Magnolia Airco Gas Products Company, Houston 1, Texas. Represented Internationally by Airco Export Corp.

Costs come down under the Airco Plan

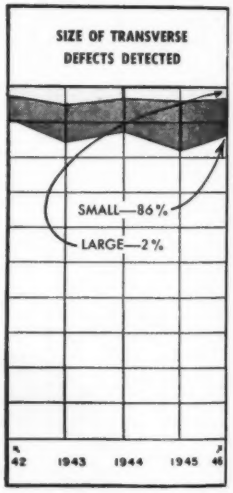
AIRCO **AIR REDUCTION**

Offices in All Principal Cities

101 RAILROADS
Use SPERRY RAIL SERVICE Regularly

RAPID GROWTH—A failure in track which grew rapidly under traffic. Fissure grew normally to 14% of the rail head area — then rapid growth (indicated by rings) caused early failure.

To Find Rail Defects When Small



Proof that Sperry's accuracy increases railroad safety. Consistent results seen in this chart have been obtained with frequent testing.

WHY
SMALL DEFECTS ARE IMPORTANT!

Detection of rail defects when *small* (less than 20% of the cross sectional area of the rail head) is important because:

1. **Small defects have caused serious derailments.**
2. **Small defects have grown rapidly (or suddenly) to a large size—resulting in broken rails.**

101 Railroads now test rails in track regularly with Detector Cars operated by Sperry. These roads have the satisfaction of knowing that they use the most efficient method of detecting *hazardous transverse* and *longitudinal* rail defects — that they obtain maximum track safety with Sperry.

Sperry stands ready to make comparative demonstration tests to prove superior detection performance. SP-110

Safety with

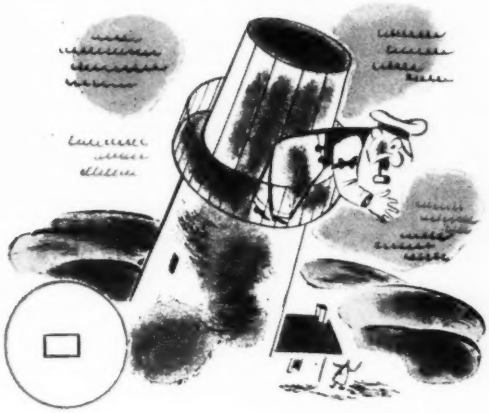
SPERRY
RAIL SERVICE
FOR TESTING RAILS IN TRACK
HOBOKEN, N. J. CHICAGO, ILL.

For additional information, use postcard, pages 545-546

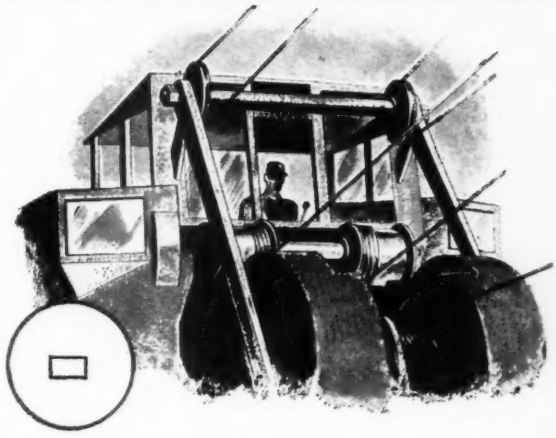
NO BLIND SPOTS WITH BROWNHOIST 360° VISIBILITY

The horse with blinders is extremely limited as to visibility. He can see in only one direction—straight ahead. He has to stretch his neck to see what's happening on either side or to the rear.

The truck driver has better visibility. He can easily see straight ahead and on both sides. But he has to stretch his neck or use awkward mirrors to see what's going on behind.

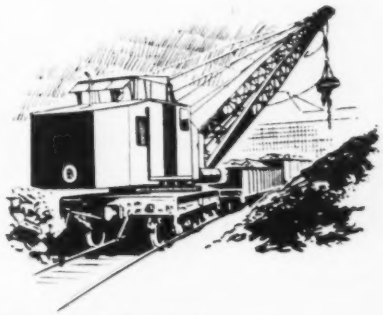


The lighthouse keeper has maximum visibility—360°. No obstructions, no blind spots. He can instantly see what's going on in any direction—front, rear, and both sides.



That's the kind of visibility the patented Monitor-type cab affords the Brownhoist Diesel Locomotive Crane operator—360°. No guesswork, no awkward maneuvering.

Full circle visibility from the cab of a Brownhoist Locomotive Crane means faster—safer—more efficient materials handling. But that's only one of the many Brownhoist advantages. Others include sure, sensitive response to air controls that are right at the operator's finger tips; smooth operating rotating and travel friction disc clutches with one-point adjustment; anti-friction bearings at all essential points; one-piece cast steel bed; 14" safety clearance between rotating bed and car body. For swift economical material handling with hook, magnet, or bucket, you can depend on a Brownhoist Locomotive Crane. Write for complete particulars.



BROWNHOIST BUILDS BETTER CRANES

INDUSTRIAL BROWNHOIST CORP., BAY CITY, MICH. • District Offices: New York, Philadelphia, Cleveland, Chicago. Agencies: Detroit, Birmingham, Houston, Denver, Los Angeles, San Francisco, Seattle, Vancouver, B. C., Winnipeg, Canadian Brownhoist Ltd., Montreal, Quebec.

In the Cascades on The Northern Pacific

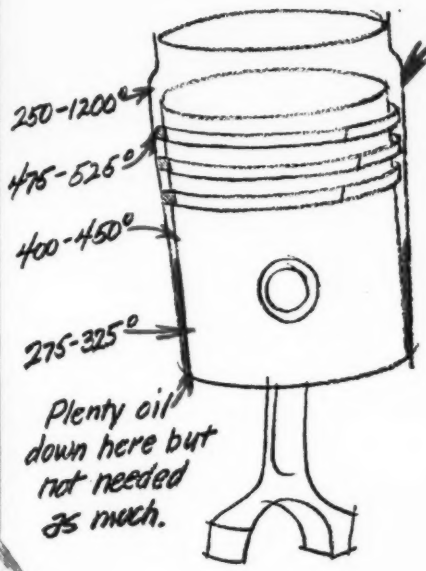
HEADFREE JOINTS

THE STRONGEST JOINT
IS
MOST ECONOMICAL

THE RAIL JOINT COMPANY Inc.
50 CHURCH ST. NEW YORK 7, N. Y.

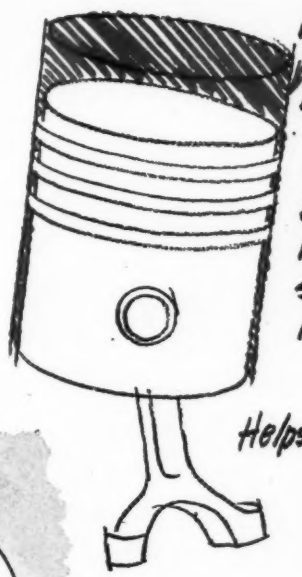
LUBE MEMO

Idea for preventing tapered cylinders!



Liners wear tapered like this— Most wear at top because ordinary lube oil scoots off hot metal, Leaves top of barrels bare.

Plenty oil down here but not needed as much.



RPM DELO DIESEL ENGINE LUBRICATING OIL stops this kind of wear. Contains adhering agent which hugs hot metal surfaces most oils leave bare.

Helps prevent blowby.

DIESEL ENGINE RPM DELO LUBRICATING OIL

Call representative Today

STANDARD OF CALIFORNIA • San Francisco, Calif.
THE CALIFORNIA COMPANY • Denver, Colo.
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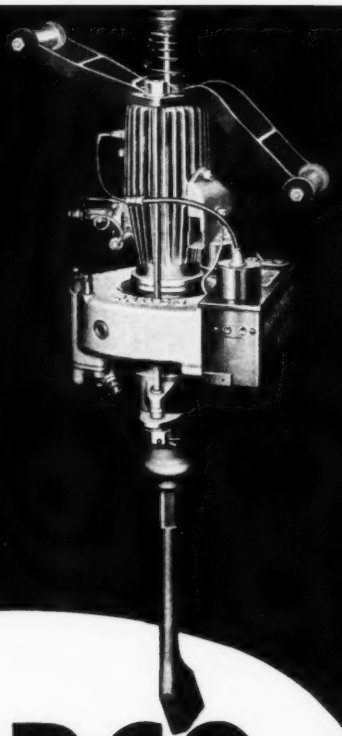
MORE WORK HANDLED...
LESS MAN TURNOVER

Spot tamping, gang tamping, cribbing and winter ice service—these are the jobs Barco Unit Tytampers are doing all over the country. Powerful and tireless, light weight Barco cleans up task after task in quick time, cuts down labor turnover because it gives a man more strength, allows him to do more uniform tamping with less effort. Send for complete information.



BARCO
UNIT TYTAMPERS

FREE ENTERPRISE—THE CORNERSTONE OF AMERICAN PROSPERITY

BARCO MANUFACTURING CO., NOT INC. • **1805 Winnemac Avenue, Chicago 40, Illinois**

In Canada: **The Holden Company, Ltd., Montreal, Canada**

ADDITIONAL INFORMATION

On Any of the Products Mentioned in This Issue

Below is a complete index of the products referred to in the reading and advertising pages of this issue. If you desire additional information on any of these, use one of the accompanying addressed cards and be sure to mention the name of the product and page number. The information will come to you direct, from the manufacturer involved, without any obligation on your part.

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BUSINESS REPLY CARD

PRODUCTS INDEX (Continued)

June, 1947

RAILWAY ENGINEERING AND MAINTENANCE

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Title or Position .....

Company .....

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RAILWAY ENGINEERING & MAINTENANCE

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NEW YORK 7, NEW YORK

READER SERVICE DEPT.

A typical example of how railroads are transforming many of their stations are these views of Santa Fe's La Plata, Mo., depot before and after it was remodeled.

- **Enhances beauty of appearance.**
- **Increases cheerfulness, comfort and safety among passengers.**
- **Contributes to increased prestige and good will.**
- **Provides lower cost protection per years of service.**

MATCH the beauty of your trim, gleaming streamliners by restyling your station with Pittsburgh's STATIONHIDE.

By using color arrangements that emphasize the best architectural features and subdue awkward angles and lines, these stations can be made to appear lower, neater and more attractive. Use of appropriate color combinations can also make interiors brighter, cheerier and more comfortable.

Pittsburgh offers STATIONHIDE in a variety of modern colors for these purposes. STATIONHIDE for exteriors is a scientifically prepared finish, custom-made for the job of beautifying and protecting railroad stations. It brushes or sprays on easily, dries to a tough, elastic coating which will stand up under the most severe climatic conditions.

Interior STATIONHIDE is an economical, durable finish which will withstand the hardest kind of wear.

Other Pittsburgh Industrial Finishes available for maintenance of fixed properties include: IRONHIDE, a tough, long-lasting finish for iron and steel structures; CEMENTHIDE for cement surfaces; SNOLITE for signs, fences, cattle guards and crossing gates; traffic and zone markings; and a series of Color Dynamics finishes for use in shops and on machinery of all kinds.

Write for Pittsburgh's booklet which lists its complete line of Structural Maintenance Finishes. Included are numerous practical suggestions for the most efficient and most economical use.

• • •

PITTSBURGH PLATE GLASS COMPANY, Industrial Paint Division, Pittsburgh 22, Pa. Factories: Milwaukee, Wis.; Newark, N. J.; Springdale, Pennsylvania; Houston, Texas; Los Angeles, California; Portland, Oregon. Ditzler Color Division, Detroit, Mich. The Thresher Paint & Varnish Company, Dayton, Ohio.

PITTSBURGH PAINTS

PITTSBURGH PLATE GLASS COMPANY, PITTSBURGH, PA.

RAILWAY FINISHES

PITTSBURGH STANDS FOR QUALITY PAINT AND GLASS

IF YOUR SYMBOL IS MISSING

YOU ARE MISSING SOMETHING

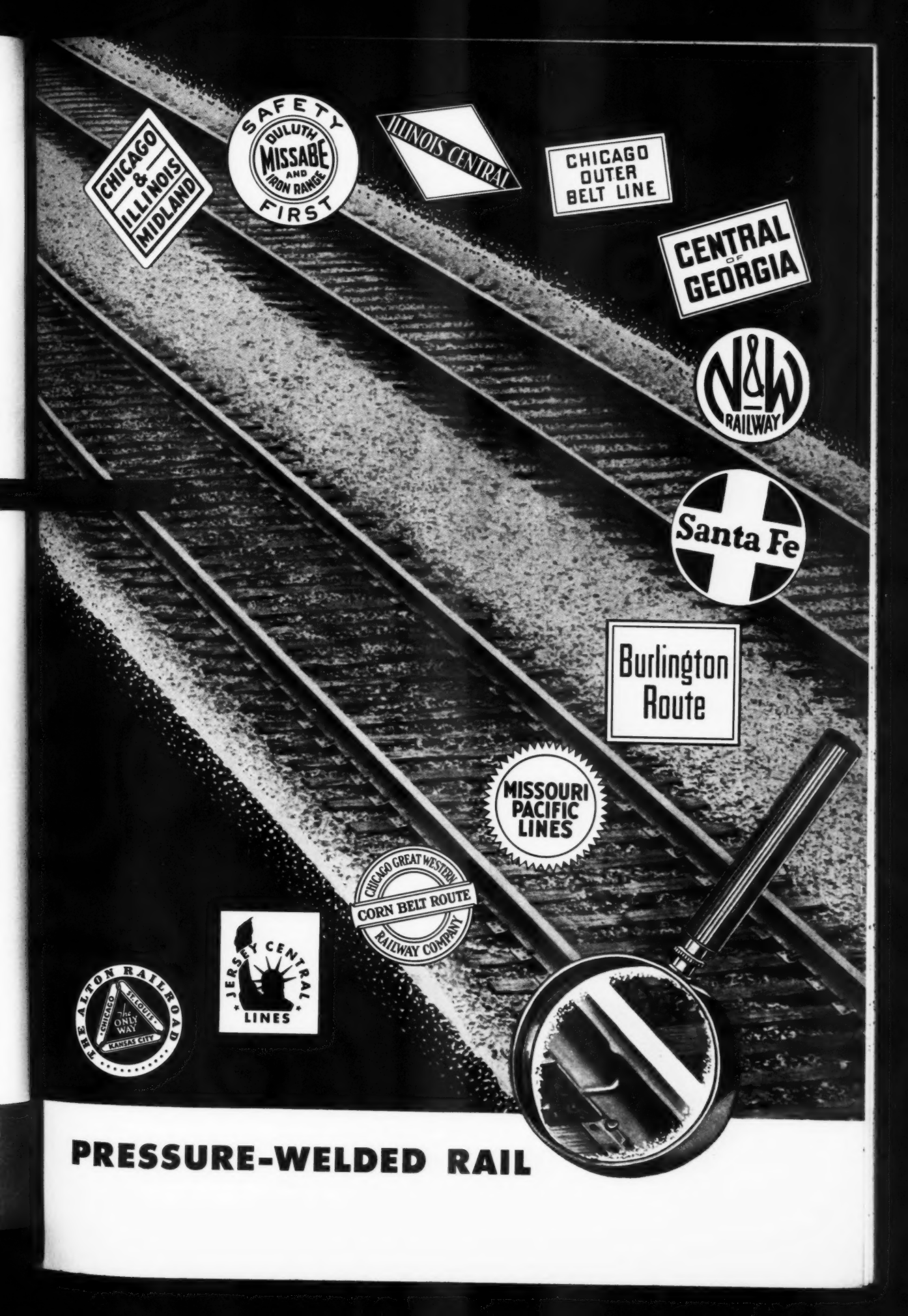
Here are the symbols of twenty-three railroads that have installed oxy-acetylene pressure-welded rail. Jointless continuous rails in the trackage of these railroads range in length from 100 ft. to 12,780 ft. In twenty-five states throughout the country, this long rail is in high speed open track, on bridges, in tunnels and streets, and in other special locations. This oxy-acetylene pressure-welded rail has no joints—needs no joint maintenance.

Continuous rail has been produced and installed under OXWELD procedures since 1938 and is no longer considered experimental. Some of the nation's fastest trains, as well as the heaviest freight equipment, now glide smoothly over oxy-acetylene pressure-welded rail.

This is another OXWELD service developed as a result of working with American railroads for more than a third of a century. Write for the booklet "How Long Can A Rail Be."

THE OXWELD RAILROAD SERVICE COMPANY
Unit of Union Carbide and Carbon Corporation
UCC
Carbide and Carbon Building Chicago and New York
In Canada:
Canadian Railroad Service Company, Limited, Toronto

SINCE 1912—THE COMPLETE OXY-ACETYLENE SERVICE FOR AMERICAN RAILROADS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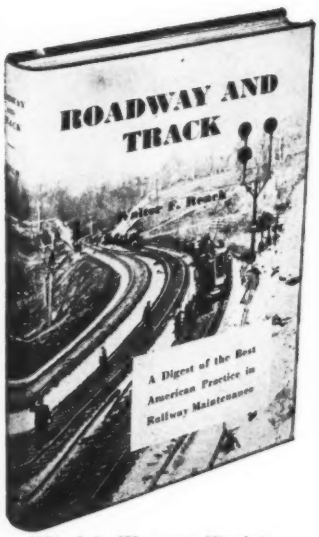
THE ALTON RAILROAD
CHICAGO
THE ONLY WAY
ST. LOUIS
KANSAS CITY
PRESSURE-WELDED RAIL

New Third Edition

ROADWAY AND TRACK

By Walter F. Rench

Formerly Supervisor on the Pennsylvania Railroad;
Author of *Simplified Curve and Switch Work*



1946. 3rd. 350 pages, 101 photographs, 19 line drawings, 12 tables, index, 6 x 9, cloth, $5.00

The new edition features the use of the latest mechanical equipment in connection with roadway and track maintenance. Older methods employed where full mechanical equipment is not available are also explained. While most of the methods described are those which are standard on the *Pennsylvania,* A.R.E.A. recommended practices and those in use on other well maintained roads have also been included.

Outstanding types of mechanical equipment used in track work are described and illustrated with action photographs. Engineering drawings show working details. The economies resulting from the adoption of modern methods are clearly outlined. Useful tables have been added to make the book suitable for reference use, as well as a practical handbook on modern methods.

For Track Supervisors

While written primarily to serve the needs of track supervisors and other maintenance officers, the new edition contains material of considerable interest to transportation and mechanical officers who require a working knowledge of the fundamentals of maintenance of way practice. Section and extra-gang foremen, who wish to acquire a broader knowledge of their work and of methods used elsewhere, will find the book helpful.

CONTENTS

Part I—ROADWAY: Essential Elements in Roadway Maintenance—The Right of Way—Drainage of Roadbed and Track—Vegetation for Banks—Economics of Roadway Machines—Labor Saving Methods and Devices in Roadway Work—Small Tools and Their Uses.

Part II—TRACK: Essential Elements in Maintenance of Track—Program for Maintenance of Way and Structures Work—The Track Obstruction—Power Machines and Equipment—Labor Saving Methods in Track Work—Track Materials and Their Uses—Practice in Rail Renewals—Practice in Rail Repair and Inspection—Maintenance of Main Tracks—Maintenance of Yards and Terminals.

Part III—SPECIAL PROBLEMS AND DUTIES: Maintenance Problems and Methods Used—Economics of Track Labor—Special Duties in the Maintenance of Way Department.

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Please send me on Ten Days Free Examination a copy of the Third Edition of ROADWAY AND TRACK by Walter F. Rench. If satisfactory, I will remit the list price of $5.00. Otherwise, I will mail the book back postpaid, without obligation.

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R. E. & M. 6-47

How RED LEAD stops Electro-chemical Action ...basic cause of Rusting

Modern science reveals many reasons *why* Red Lead has earned its place as the "standard" metal protective paint.

One very basic factor is Red Lead's ability to halt electro-chemical activity–the fundamental cause of rusting.

In this electro-chemical action, weak currents are generated, because of chemical and physical differences in the metal, as well as local differences in environment. As a result, the iron goes into solution and rusting is promoted.

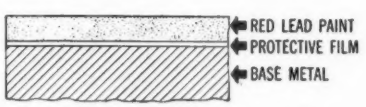
These electro-chemical conditions are always present; but Red Lead eliminates their harmful effects.

Here's how: Red Lead possesses unique properties which enable it rapidly to convert the iron solubles into stable compounds. This forms a tightly adherent, protective film located at the interface of the metal and the Red Lead coating (see diagram).

This film, so thin it cannot be seen by the eye, is in direct contact with the metal. It effectively inhibits electro-chemical action, and the consequent corrosion of the metal.

Naturally, for *continued* protection, the film must remain unbroken. Here again, in the same way, Red Lead heals any small breaks in the protective shield due to abrasive action or other causes.

Thus, the metal remains in a rust-inhibited condition as long as Red Lead coats the surface.



The Film that halts corrosion: *This diagram shows the protective shield, located at the interface of the metal and paint film. The formation and continuous maintenance of this film by Red Lead stops electro-chemical action...inhibits the metal from rusting.*

* * *

Remember, too, that Red Lead is compatible with practically all vehicles commonly used in metal protective paints, including many of the fast-drying resin types.

Specify RED LEAD for ALL Metal Protective Paints

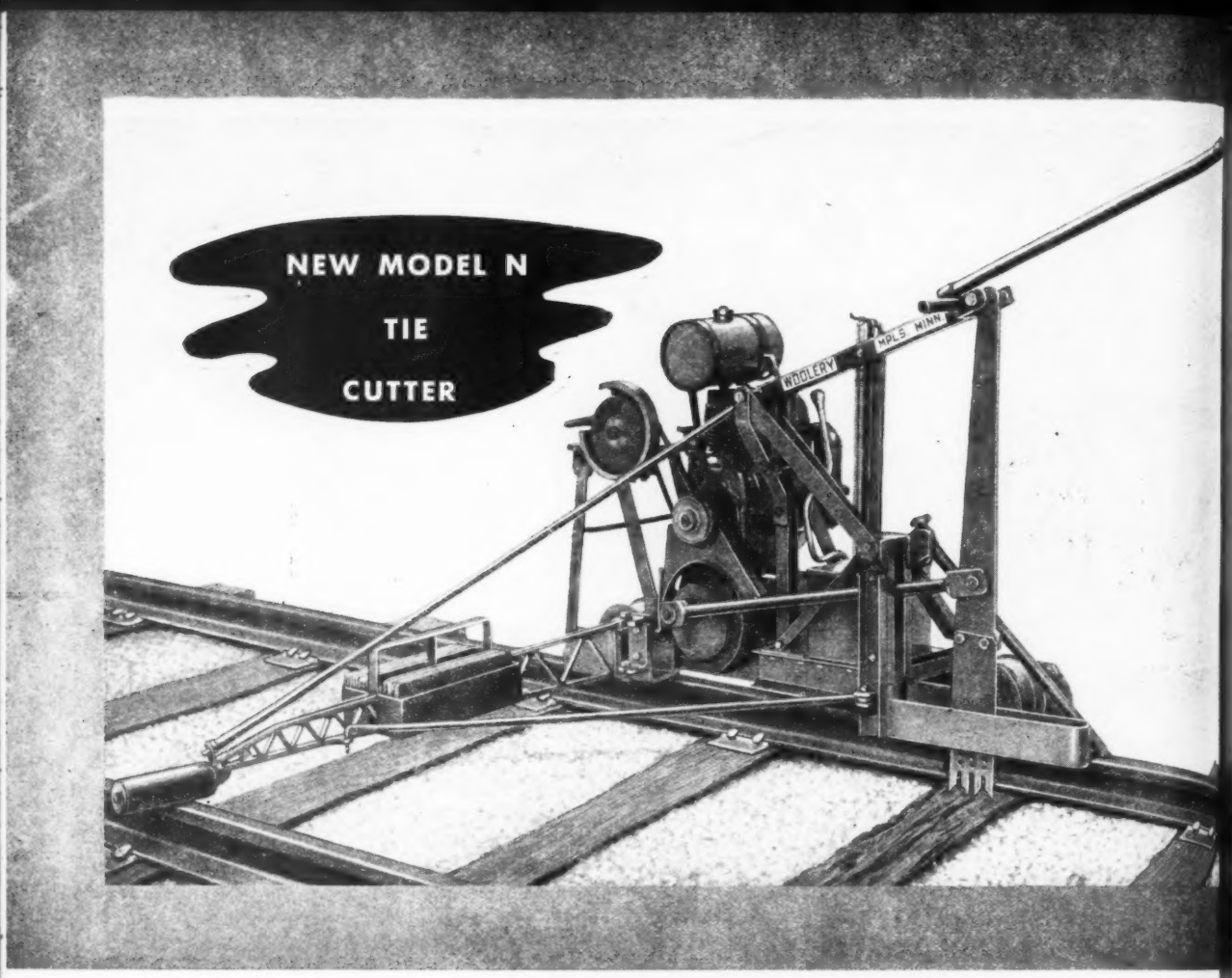
The rust-resistant properties of Red Lead are so pronounced that it improves any metal protective paint. So, no matter what price you pay, you'll get a better paint if it contains Red Lead.

* * *

The benefit of our extensive experience with metal protective paints for both underwater and atmospheric use is available through our technical staff.

NATIONAL LEAD COMPANY: New York 6; Buffalo 3, Chicago 8; Cincinnati 3; Cleveland 13; St. Louis 1; San Francisco 10; Boston 6, (National Lead Co. of Mass.), Philadelphia 7, (John T. Lewis & Bros. Co.); Pittsburgh 30, (National Lead Co. of Pa.); Charleston 25, W. Va., (Evans Lead Division).

DUTCH BOY
Reg. U. S. Pat. Off.
RED LEAD



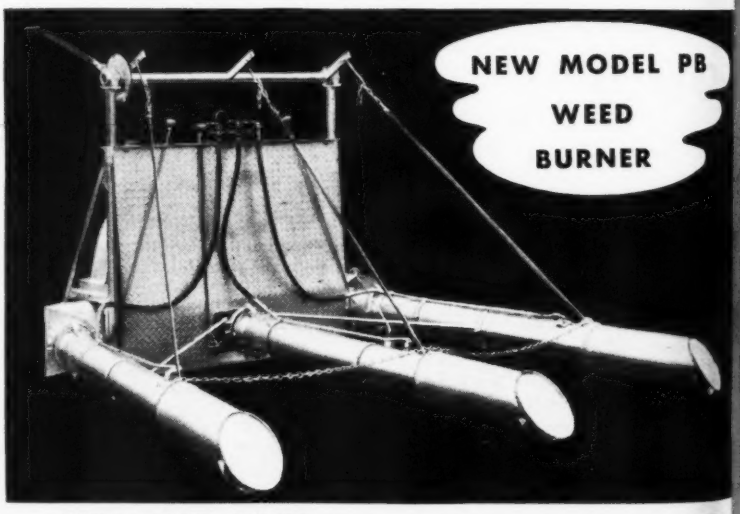
TWO NEW
WOOLERY MACHINES

for better maintenance
at lower cost

THE MODEL "N" TIE CUTTER, incorporating the basic features of the Woolery Tie Cutter, at a substantial reduction in price.

The Woolery Tie Cutter eliminates the slow, laborious, back-breaking, expensive features of tie replacement by old methods. No trenching or jacking up of track; ballast disturbance is kept at a minimum. Advanced engineering has produced a light weight, sturdy machine to make the work of tie replacing quicker, easier, better, and at a substantial saving in tie replacement costs.

A reciprocating cutting blade is a fundamental feature. Average time for a cut is 25 seconds. After tie is cut in three pieces, ends are easily pried out with a bar—using center section as a heel. Center section is then lifted from between rails and new tie seated on a firm permanent base requiring little or no tamping.



MODEL PB WEED BURNER—May be mounted on a push car to be hauled by a track motor car for on-track use, or on a 1½-ton truck or two-wheel trailer for off-track service, and when not in service is easily removed and stored, releasing truck or push car for other work. Burns a 15-foot swath; with outside arms spread, burns to 25 feet by making second trip. Requires only two men to operate. Adjustable burner arms and individual flame controls. Adaptable as a snow melter.

WOOLERY MAINTENANCE MACHINERY

Weed Burners — Tie Cutters
Creosote Sprayers

WOOLERY MACHINE COMPANY

MINNEAPOLIS — Pioneer Manufacturers of — MINNESOTA

RAILWAY MAINTENANCE EQUIPMENT

RAILWAY WEED BURNERS • MOTOR CARS • TIE CUTTERS • TIE SCORING MACHINES • RAIL JOINT OILERS • CREOSOTE SPRAYERS • BOLT TIGHTENERS

EXCLUSIVE EXPORT REPRESENTATIVES: PRESSED STEEL CAR COMPANY, INC., PITTSBURGH, PENNA.

MONOTUBES...
a pile of strength

THE steel plant foundation job pictured here got off to a good start—with Monotubes, the tapered steel piles that have extra advantages.

These 12″ diameter Monotubes—in 72 to 80-ft. lengths—were furnished in two sections to eliminate use of unusual length leads. Note in circle at left, driving is under way. In circle at right, note how extension has been positioned and fully welded without interfering with driving operations. Time is saved, labor costs reduced.

Monotubes have other advantages that make savings for job-wise builders. Their fluted, tapered construction speeds driving; they are easily extendible to any required length, right on the job; they are light in weight and easy to handle; and, because of tubular design, Monotubes can be thoroughly checked, top to toe, before concreting.

You can depend upon Monotubes for economy and efficiency in constructing buildings, bridges, piers, airports, highways. Available in gauge, size and taper to meet varying soil conditions. For complete information, write The Union Metal Manufacturing Company, Canton 5, Ohio.

UNION METAL
Monotube Foundation Piles

HOW TO SAFEGUARD THE "DANGER ZONE" IN YOUR DRAINAGE PIPE

Like the suit that must be discarded because the seat of the pants is worn through, 75% of the average drainage pipe is still serviceable when it is consigned to the scrap pile.

It goes there *because the bottom is worn through.*

This doesn't happen to ARMCO Paved Invert Pipe. A smooth, thick bituminous pavement in the bottom of the pipe protects this danger zone from erosion . . . makes the *bottom last as long as the top.*

Where drainage is severely corrosive, you can specify the added protection of an Asbestos-Bonded coating for the complete pipe. This coating is immune to corrosive soils, acids, alkalies and gases.

Your culverts last longer, cost less per year of service, and you get full value out of your investment.

There is an ARMCO Pipe to meet every service condition. For utmost economy choose the one that meets your specific requirements. All ARMCO Pipe has flexible corrugated metal design to assure ample strength under high fills and heavy loads. Write Armco Drainage & Metal Products, Inc., 1795 Curtis Street, Middletown, Ohio.

ARMCO Paved Invert Pipe is reinforced on the bottom—the "danger zone" for erosion.

ARMCO

CORRUGATED METAL PIPE

For additional information, use postcard, pages 545-546

A new "FIGHTING FOUR"!

Now on the production lines are four new "Caterpillar" Diesel Tractors and Motor Graders—with decisively greater horsepower, strengthened design, and many mechanical refinements. . . . All brought to you in line with "Caterpillar's" policy of building ever better products for a steadily increasing number of satisfied users!

Without appreciable added weight, but with engines of increased piston displacement, still tougher materials, free-flow manifolding, larger crankshafts and numerous other improved features, these new "Caterpillar" Diesels enable you to *handle bigger loads—work at higher average speeds — accomplish more work per day — increase your earnings very substantially.*

These important advancements are the result of many months of quiet, patient but intensive "Caterpillar" engineering, metallurgical research, and factory tooling. They are dedicated to your future success and profits. You'll be delighted with the further details your "Caterpillar" dealer will gladly give to you.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

GREATER HORSEPOWER

FASTER WORKING SPEEDS

MANY IMPROVEMENTS

HIGHER EARNING CAPACITY

THE NEW TRACTORS

The D6—65 drawbar horsepower
2600 pounds additional pull in first

The D4—43 drawbar horsepower
1600 pounds additional pull in first

BOTH—36% larger crankshaft journals • 30% larger crankpins • Solid aluminum alloy bearings • Chrome-plated top piston rings • Free-flow manifolding, with individual ports for each cylinder • More effective, single-unit air cleaner • Improved fuel-injection pumps and injection valves • Improved lubricating oil cooling radiator • More effective oil-pressure control • Full-machined cylinder liners, with "no-corrosion" seals

THE NEW MOTOR GRADERS

The No. 12—100 brake horsepower

The No. 112—70 brake horsepower

BOTH—Constant-mesh transmission • Helical gears—for less noise and easier shifting • Arched front axle—for more ground clearance • Steering shock absorber and anti-friction bearings • Improved power-control clutch, with anti-coasting brakes • Other engine refinements as in Tractor engines

CATERPILLAR DIESEL

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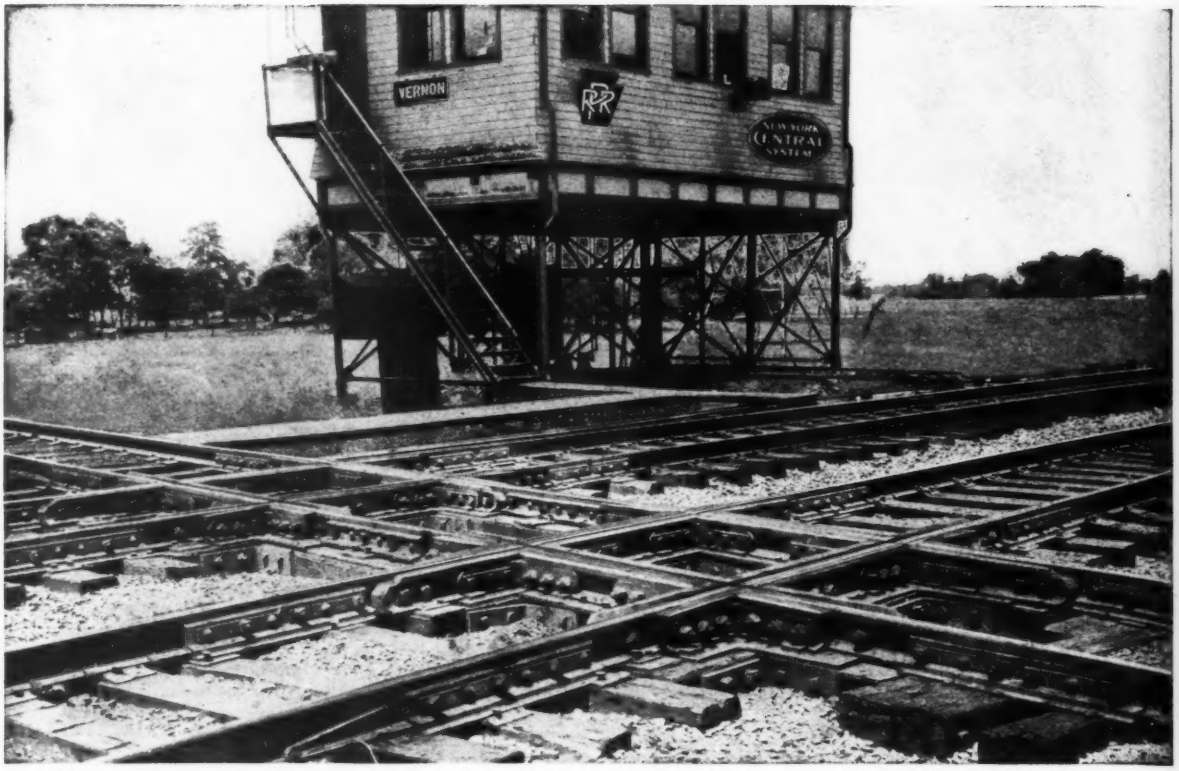
ENGINES • TRACTORS
MOTOR GRADERS
EARTHMOVING EQUIPMENT



AT VERNON, OHIO . . .

HEAVIER TRAINS » » HIGHER *Speeds*

For such modern traffic, trackwork structures must be more rugged than ever before.

The WEIR *Improved* HEAT TREATED RAIL CROSSINGS, at this heavy duty intersection of the Pennsylvania and New York Central Railroads, have made an outstanding record for long life and minimum maintenance.

Standard and Special Track Work for Steam Railroads Since 1882

WEIR KILBY CORPORATION

CINCINNATI 12, OHIO — **BIRMINGHAM 7, ALA.**

Successors to

WEIR FROG CO. . . . KILBY FROG & SWITCH CO. . . . CINCINNATI FROG & SWITCH CO.

Action and Power with "SUPERSOCKETS"

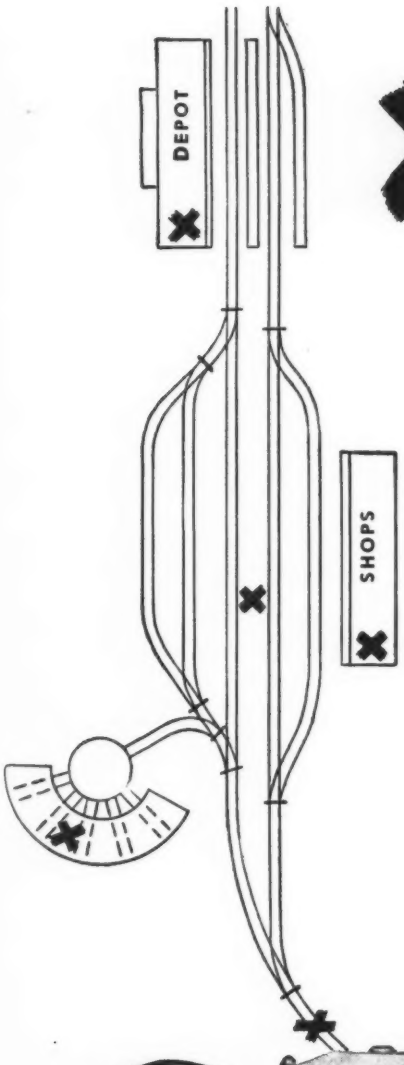
● When you want *action* and the safety of sure-gripping *power*, you can't beat Williams "Supersockets." These versatile wrenches, with their various combinations of handles, parts and socket types, provide greater speed even under adverse working conditions.

Williams "Supersockets" are available in 5 different patterns, with drives ranging from 1/4" to 1" square. Socket openings range from 3/16" to 3 1/8". Sold by Industrial Distributors everywhere.

J. H. WILLIAMS & CO., Buffalo 7, N. Y.

WILLIAMS

DROP-FORGINGS AND DROP-FORGED TOOLS



MARKS THE SPOT

where the "handy-man" can help you!

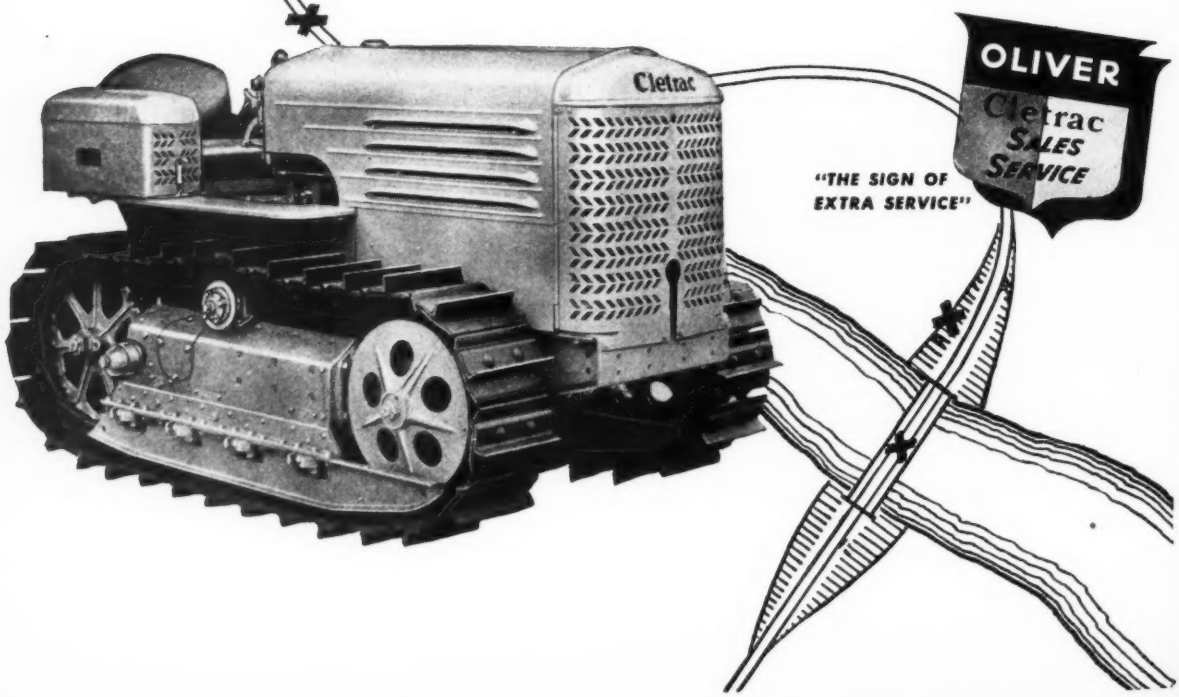
Depot, roundhouse, shop, right-of-way, bridges, tunnels, are all spots where the "handy-man," an Oliver "Cletrac" tractor, can help you get more for your maintenance dollar. Working off-track, these husky dependable tractors do not hold up traffic. A Cletrac with its auxiliary equipment can perform the majority of tasks that call for a rugged, mobile unit faster—more economically.

They weld rail ends; clean ditches; cut grades; clear away snow and slides; spot, load and unload cars; move equipment around shops, yards and depots, sweep up debris and perform many other useful tasks. Along the right-of-way, they frequently can eliminate the need for expensive work trains and avoid the use of long cables or pipe lines in maintenance work.

For facts on how Cletrac's can help you stretch your maintenance dollars, write The OLIVER Corporation, Industrial Division, 19300 Euclid Ave., Cleveland 17, Ohio.

Cletrac

a product of The OLIVER Corporation



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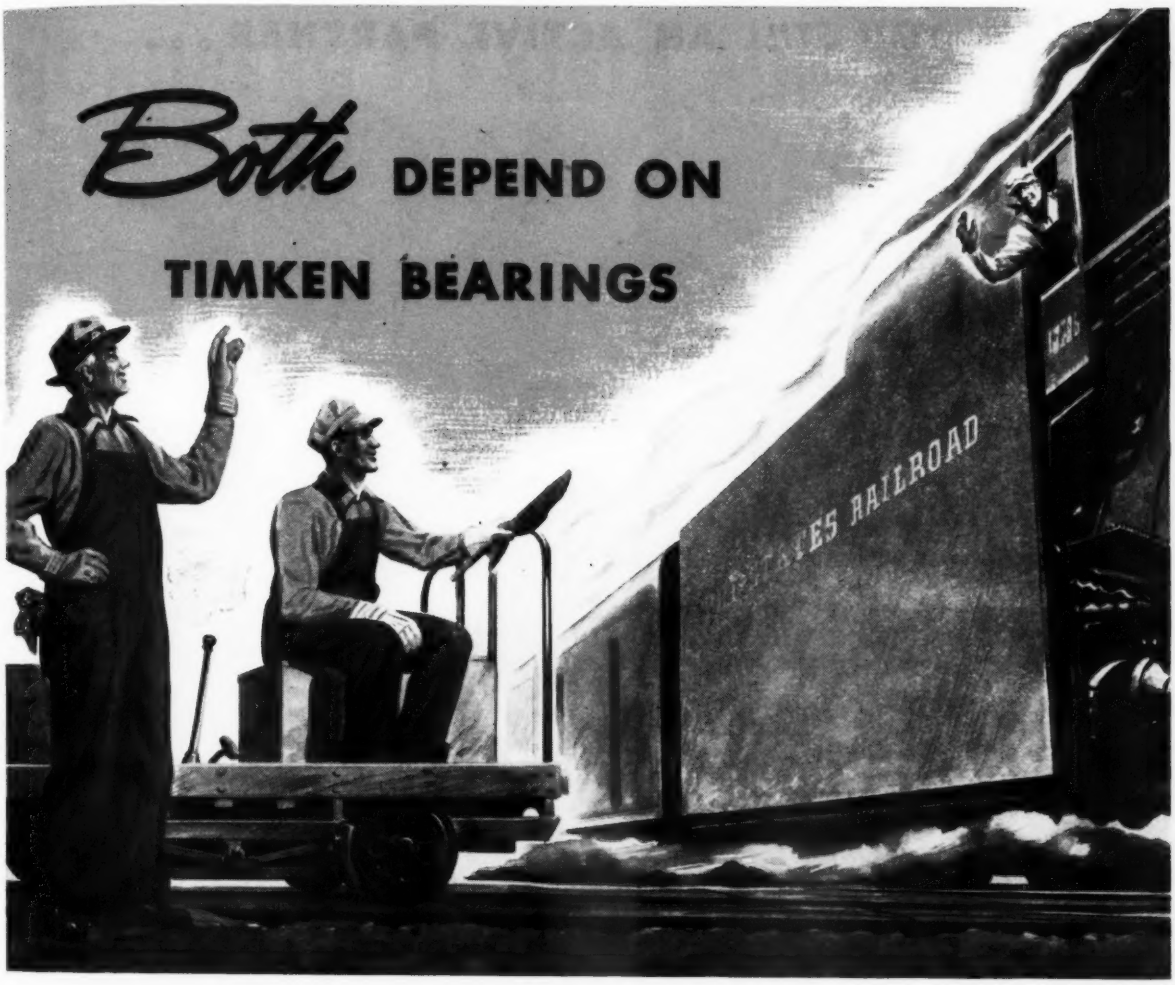


Main line and auxiliary equipment of all kinds using Timken Roller Bearings have these advantages in common: constant availability for service; ability to keep going for maximum periods without shopping; minimum attention for lubrication and maintenance.

American railroads use Timken Bearings in locomotives, passenger cars and streamlined trains to enable them to operate heavier trains on faster schedules.

They use Timken Bearing Equipped section motor cars to help maintain their tracks in sound, safe condition at all times. When buying new section cars of any type it will pay you to ask this question: "Are they equipped with Timken Bearings?" If you are a car builder, look for the trade-mark "TIMKEN" on every bearing you install. The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN
TRADE-MARK REG. U.S. PAT. OFF.
TAPERED ROLLER BEARINGS

48 Years of Engineering and Metallurgical Development

ARE YOU STILL AN ACTIVE PARTNER...

in this "7½ billion-a-year" success?

NEVER was there a partnership like the nation-wide brotherhood of volunteers who have helped sell, advertise, and promote sales of U. S. Savings Bonds! Their program is the greatest sales operation at the lowest cost in history.

Your continued support in promoting the Payroll Savings Plan will help "America's partnership" this year to repeat or surpass last year's four-star performance, in which sales of Savings Bonds were 7½ billion dollars—*exceeding redemptions by far more than a billion!*

So keep up the splendid work—keep on telling and selling your employees the advantages of Payroll Savings: (1) ease; (2) regularity; (3) safety of investment; (4) security for the individual and the nation; (5) $4 for every $3 at maturity! And, remember, people with a stake in the future are the most stable, most productive employees.

For any help you need in conducting the Plan, call on your State Director of the Treasury Department's Savings Bonds Division.

New Savings Bonds Plan won't affect the P.S.P.

THE Treasury Department and the banks of America are making it possible for farmers, doctors, and other self-employed people to participate in "automatic" Bond buying by special arrangement with their banks. This extension of the Savings Bonds program is not a partial payment plan and is intended *only* for people who are not in a position to take advantage of the Payroll Savings Plan.

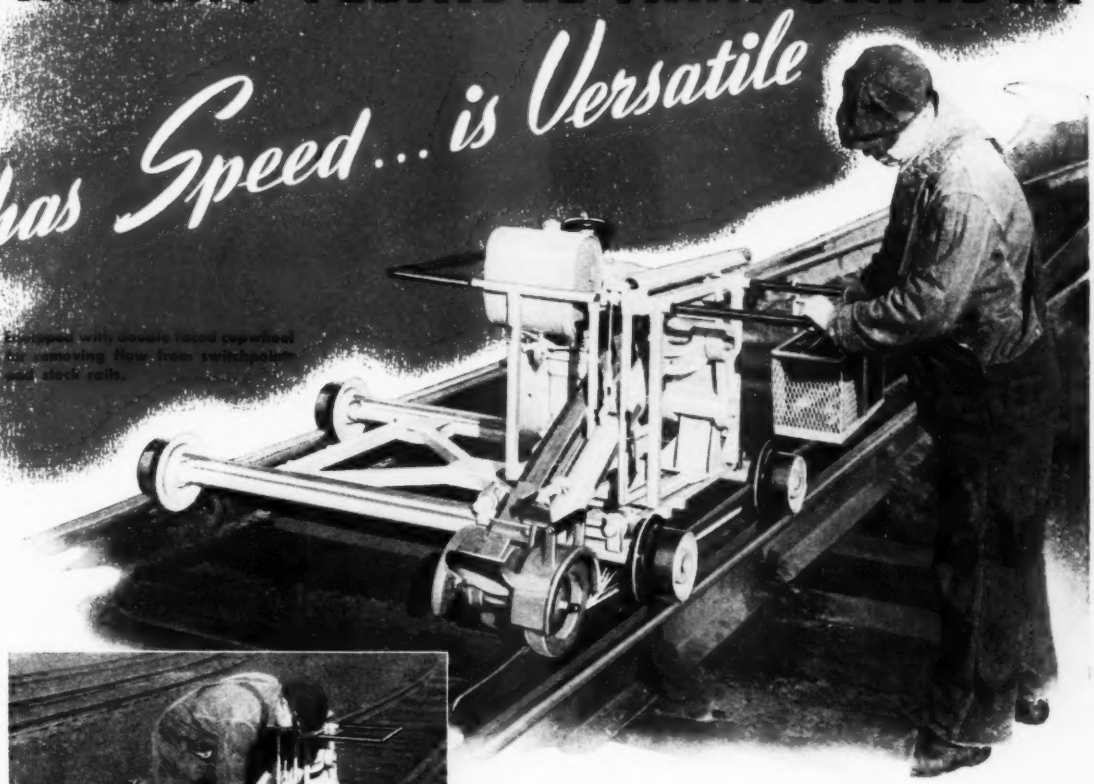
The Treasury Department acknowledges with appreciation the publication of this message by

RAILWAY ENGINEERING AND MAINTENANCE

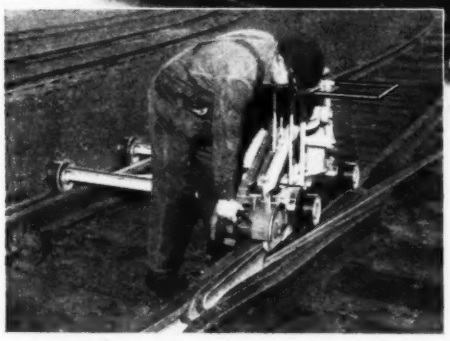
This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and The Advertising Council.

NORDBERG FLEXIBLE ARM GRINDER

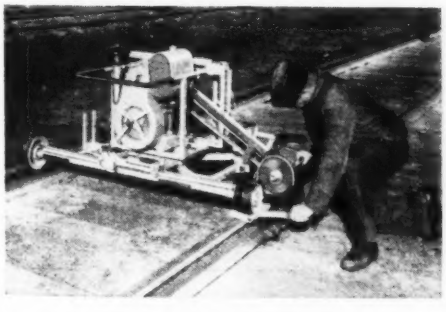
has Speed... is Versatile



Equipped with double faced cupwheel for removing flow from switchpoints and stock rails.



Frogs and flangeways are ground with an 8" x 1" flat wheel.



Arm is crosswise to the rail for rail end slotting with thin wheel.

- *Removes flow at switchpoints and stock rails.*
- *Grinds frogs and flangeways built up by welding.*
- *Undercuts stock rails to house switchpoints.*
- *Slots rail ends rapidly—with utmost convenience.*
- *Grooves rail for wire insert at turnouts.*

For speed and all 'round convenience and adaptability, no grinder can equal the performance of the Nordberg Flexible Arm Grinder. The grinding wheel mounted on the end of the swinging arm easily reaches all places where grinding is done on rail, switches and crossings. The rapid rate at which this grinder removes metal, its ease of handling and its many applications makes it a valuable tool for track maintenance work. For your grinding jobs, investigate the merits of the Nordberg Flexible Arm Grinder.

NORDBERG MFG. CO.
MILWAUKEE 7, WISCONSIN

NORDBERG RAIL GRINDERS

BUILT IN FIVE TYPES • MEET ALL RAIL GRINDING DEMANDS

FORWARD 15 m.p.h. four speeds

TOURNADOZER..

PRODUCTION TABLE — PUSHER LOADING			
Haul One-way	Tournapulls served	Haul One-way	Tournapulls served
300′	2	5,000′	7
1,000′	3	6,000′	8
2,000′	4	7,000′	9
3,000′	5	8,000′	10
4,000′	6	10,000′	13

PRODUCTION TABLE — DIRTMOVING		
Haul	Yards in 1 Hour	Yards in 8 Hours
50′	184	1472
100′	118	944
200′	66	528
300′	46	368
400′	35	280

Above production based on good working conditions, negligible grades, level cuts, efficient management and 60-minute-per-hour operating efficiency.

LETOURNEAU LET EQUIPMENT

See your Le Tourneau Distributor NOW for complete information

REVERSE 15 m.p.h. four speeds

Dozer travel is 50% forward, 50% reverse, so the revolutionary new four-wheel-drive Tournadozer gives you approximately double the fastest crawler's forward speed and full range of *FORWARD SPEEDS IN REVERSE.*

Dozer work involves lots of shifting, so the high-speed Tournadozer has constant-mesh Tournamatic transmission . . . gives you instantaneous change of gear ratios forward or reverse, any time . . . any place. Just move lever to any gear selection you want and you're in it and *ON YOUR WAY . . . . RIGHT NOW.*

Dozer duty is hard on tracks, so the new Tournadozer rolls on rubber . . . big tough tires 21.00 x 25. That cuts out a lot of track repair delays and materially *CUTS MAINTENANCE EXPENSE.*

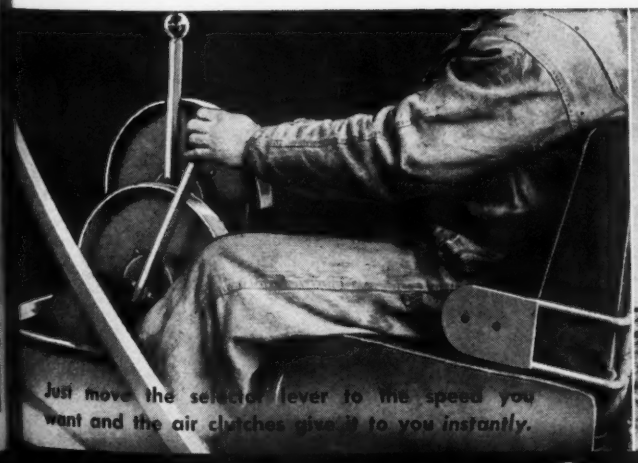
Dozer jobs often get into soft going, so the big Tournadozer tires have tapered beads. That means low tire pressure . . . extra flotation . . . and lets you use extra low pressure to get *PLENTY OF TRACTION IN SAND AND MUCK.*

Dozer work has always been tough on the operator . . . Tournadozer operators ride easy on low pressure pneumatic tires . . . sit easy on hydraulic suspension seat . . . take it easy because air-actuated finger-tip controls *TAKE LABOR OUT OF OPERATING.*

Dozer travel often involved slow on-job moves and expensive haul from job to job. But the new Tournadozer goes anywhere on the job or *DRIVES JOB-TO-JOB FAST . . . . AT 15 MPH.*

Check your LeTourneau Distributor for delivery. **Order NOW.**

4 wheel drive on rubber



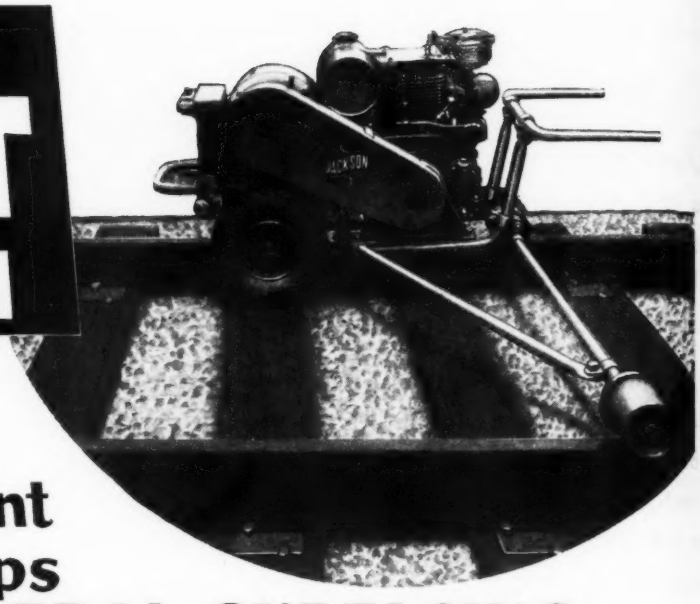
Just move the selector lever to the speed you want and the air clutches give it to you instantly.

4-wheel drive plus big, low-pressure tires give plenty of traction and flotation to move big loads of abrasive, loose sand.

LETOURNEAU PEORIA, ILLINOIS — HIGH-SPEED RUBBER-TIRED — TOURNADOZERS

FIRST MACHINE DESIGNED FOR DOZING AND PUSHING

for SPOT Tamping buy



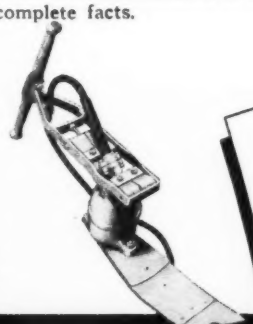
The Equipment that's Also Tops for ALL GENERAL SURFACING and NEW BALLAST INSERTIONS!

For the small section gang standard Jackson Tampers and Power Plants are ideal for Spotting and such other out-of-face work as gangs of this type do on many roads.

For any major job of ballast placement the same standard Jackson Tampers and Power Plants used as section equipment can be grouped for highly efficient large gang operation.

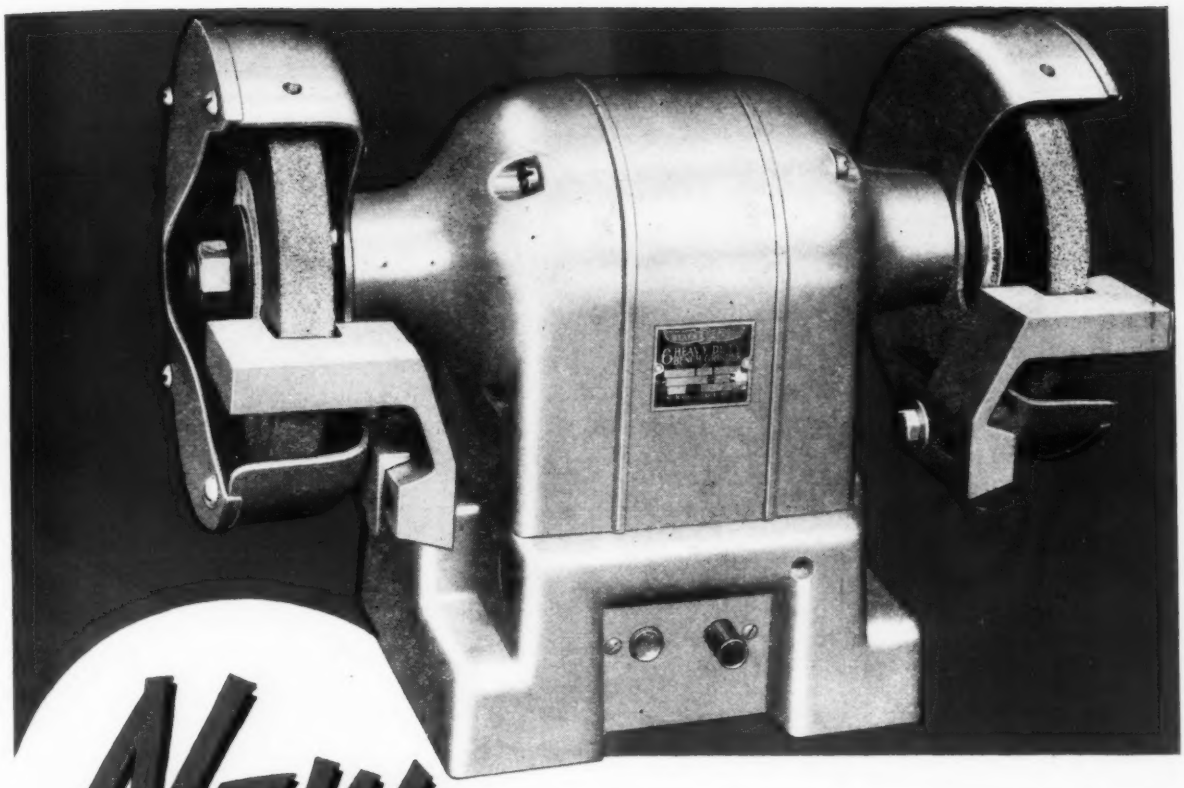
TAKE a look at the M-2 Outrigger-mounted JACKSON POWER Plant. It's a highly mobile unit — designed to operate two or four of the famous JACKSON Vibratory Tie Tampers — light enough for two men to remove from the track in a matter of moments, and equipped with a permanent magnet generator that requires no adjustment or maintenance. It's by far the most reliable Portable Power Plant ever built. Give your section gangs the combination of this Power Plant and Jackson Tampers and watch their production soar!

But that's only half the story. Though many railroads prefer section and extra gangs to have their own Jackson Tampers, when a general lift is necessary or new rail laid your section equipment may be grouped in extra gang service for the most efficient ballast placing combination obtainable; and when the job is done, again returned to the sections for maintenance work. That's mighty worthwhile versatility. And remember that whether it's spot tamping or a major ballast placing job, JACKSON Tampers will do more and better work with less upkeep expense than any other equipment — the basic reason why they are extensively used by more than 4 out of 5 of the leading roads throughout the nation. Furthermore, when used on both classes of work, the mechanical maintenance of equipment is uniform. Let us give you the complete facts.



JACKSON Tie Tampers and POWER PLANTS

ELECTRIC TAMPER & EQUIPMENT CO., Ludington, Michigan



NEW 6" HEAVY-DUTY BENCH GRINDER

for FASTER Grinding . . . Wire Brushing . . . Buffing!

From streamlined housing to internal engineering, the new Black & Decker 6" *Heavy-Duty* Bench Grinder is designed to turn out better work in the shortest possible time. In the maintenance shop, this new Bench Grinder soon pays for itself and cuts costs on grinding jobs, cleaning parts, removing carbon, rust, scale and corrosion. Helps your workers sharpen all cutting tools quickly. Speeds up buffing, burnishing, polishing and finishing of all metal parts, too.

Study the important facts, on this Tool, shown at the right. Then ask your nearby Black & Decker Distributor for full information on these useful Bench Grinders and the many other Black & Decker Portable Electric Tools for railway maintenance. Write today for your free copy of our catalog to: The Black & Decker Mfg. Co., 663 Pennsylvania Ave., Towson 4, Md.

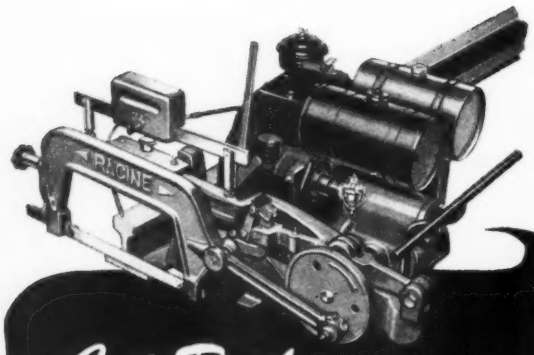
LEADING DISTRIBUTORS EVERYWHERE SELL

Black & Decker

PORTABLE ELECTRIC TOOLS

READ THESE FACTS *on this Useful Tool*

- Modern streamlined die-cast housings improve working clearances and decrease weight. Modern engineering means maximum efficiency.
- Powerful "constant-speed" motor, built by Black & Decker, mounted on ball bearings, maintains high operating speed under load.
- Wheel guards and covers made of steel to give extra protection. Ample room for standard three-section wire wheel brush without changing the guard.
- U-shaped tool rests fit around grinding wheel for improved support in tool sharpening. Adjustable for wheel wear.
- Machined hole in base of Grinder provides for mounting attachments.
- Two-pole push-button switch is recessed in housing to prevent accidental contact, yet remains easy to reach.
- Standard equipment includes two 6" grinding wheels; medium grade for rough, fast work . . . fine grade for finish grinding and tool sharpening.



Cut Rail . . .
RIGHT ON THE TRACK
with . . .

RACINE PORTABLE Rail Saws

Your track maintenance and repairs can be speeded up with Racine Portable Rail Cutting Machines. This equipment cuts rail ends right on the track. No extra handling or hauling of the rail to central cropping plant.

Only one man needed to operate the Racine Rail Saw. Two men can easily carry it from rail to rail. These fast, accurate machines produce smooth, clean cuts without the overheating of rail ends that so often starts fractures leading to rail failure. Model 15 for rails to 7⅜" high; Model 16 for rails to 10" high.

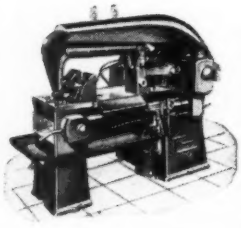
SIX COMMON JOBS FOR THIS MACHINE

1. Cutting and fitting rails at interlocking plants, crossings and switches.
2. Closing track in rail-laying operations.
3. Smooth, accurately cut rail for insulated joints.
4. Proper staggering of joints in curves.
5. Removing split, worn and battered rail ends.
6. Cutting out sections of wheel burned rails and fissures.

Models are available with gas engines, compressed air or electric motors. Write for complete catalog No. 58A. Address RACINE TOOL AND MACHINE CO., 1738 State St., Racine, Wisconsin.

RACINE HEAVY DUTY METAL SAWS FOR RAILROAD SHOPS

Cut axle shafts, boiler pipe, channels, angles and beams quickly and accurately. Models are available in all price ranges for either high speed production metal cutting or general all around shop work. Capacities 6" x 6" to 20" x 20". Ask for general catalog No. 12 giving description of complete Racine Saw line.



STANDARD FOR QUALITY AND PRECISION
RACINE
RACINE TOOL and MACHINE CO.

RACINE

10 MORE LAYNE UNITS FOR WICHITA, KAN.

Wichita—magic city of progress—cross roads of the western airlines—growing and prospering has just ordered ten more complete Layne high efficiency Well Water Units. This makes a total of thirty-five, with a daily production capacity of 45 million gallons of water. Here again, quality, sturdiness, and overall efficiency of Layne Well Water Systems have scored definite superiority.

Wichita long endured a dangerously low water supply, but Layne top flight hydrological engineering skill explored and found water bearing strata—and then installed thoroughly modern water producing equipment.

Wichita is only one of many cities that profited by placing its water producing problem up to Layne — the world's most experienced ground water developers.

Unusually interesting and valuable bulletins, catalogs, etc., on water producing equipment and well installation may be obtained by writing Layne & Bowler, Inc., General Offices, Memphis 8, Tennessee.

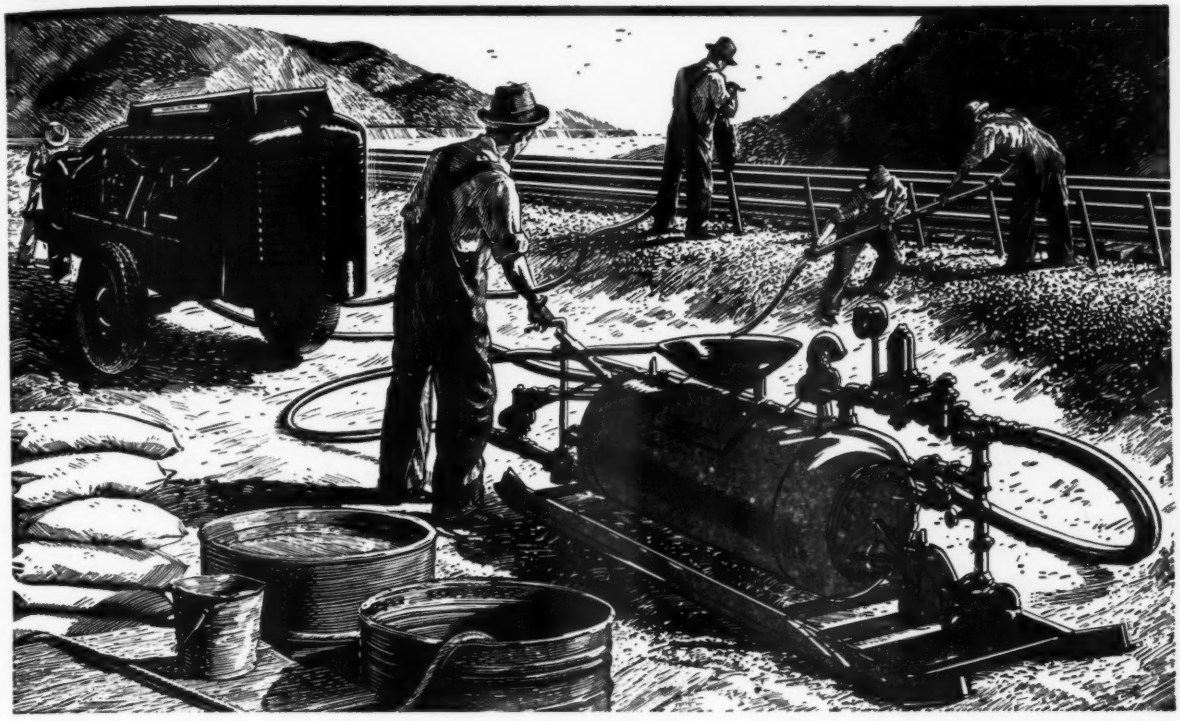
PUMPS for Wells—Lakes—Rivers—Reservoirs—Irrigation Projects—are obtainable in sizes from 40 to 16,000 gallons per minute, powered by electric motor, V-Belt or angle gear drives. Write for illustrated Pump Catalog.

LAYNE

WELL WATER SYSTEMS
VERTICAL TURBINE PUMPS

AFFILIATED COMPANIES: Layne-Arkansas Co., Stuttgart, Ark. * Layne-Atlantic Co., Norfolk, Va. * Layne-Central Co., Memphis, Tenn. * Layne-Northern Co., Mishawaka, Ind. * Layne-Louisiana Co., Lake Charles, La. * Louisiana Well Co., Monroe, La. * Layne-New York Co., New York City * Layne-Northwest Co., Milwaukee, Wis. * Layne-Ohio Co., Columbus, Ohio * Layne-Pacific, Inc., Seattle, Washington * Layne-Texas Co., Houston, Texas * Layne-Western Co., Kansas City, Mo. * Layne-Western Co. of Minnesota, Minneapolis, Minnesota * International Water Supply Ltd., London, Ontario, Canada * Layne-Hispano Americana, S. A., Mexico, D. F.

GIVING THE ROAD BED SOLID SUPPORT



Your roadbed maintenance costs head for the cellar when Blue Brute Track Teams . . . *fast working, economical, matched* . . . stiffen the track's backbone.

Take the new Blue Brute Horizontal Grout Mixer-Ejector for example . . . a portable, air operated machine that works at pressures up to 100 psi. It handles a wide range of grout consistencies easily, efficiently . . . gives positive, thorough mixing . . . provides agitation during work interruptions . . . includes a by-pass arrangement allowing operator to use air blast without disconnecting grouter.

*Reg. U.S. Pat. Off.

And look at the Blue Brute Compressor . . . a tough, two-wheeled tornado with a capacity of 105 cubic feet — enough to run Mixer-Ejector, Air Hammer and Tie Tampers — with plenty of punch in reserve. It's built for real economy, too . . . Feather* Valves for efficient air control . . . Fuel Saver that regulates flow to give you the most air per gallon.

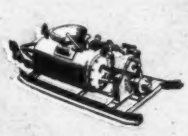
Matched partners in the Blue Brute Track Team are hard slugging Air Hammers and Tie Tampers . . . designed for speed, economy and ease of handling . . . also a complete line of track grouting accessories. Blue Brute Track Teams will keep you consistently ahead of your maintenance schedule . . . and at substantial savings. Contact your Blue Brute distributor — he'll prove to you *there's more worth in a Blue Brute.*

H3-7

WORTHINGTON

Worthington Pump and Machinery Corporation, Worthington-Ransome Construction Equipment Division, Holyoke, Massachusetts

BUY BLUE BRUTES



Pneumatic Grouter

Portable Concrete Mixer

Self Priming-Centrifugal Pump

Hand Held Air Tools

Railcar Compressor

FOR EVERY CONSTRUCTION AND MAINTENANCE JOB

What's a Magneto's *True Cost?*

It isn't on the price tag, of course. Cost per year of service is the only true cost . . . the sum of first cost and all maintenance and "down-time" costs divided by the number of years the magneto lasts.

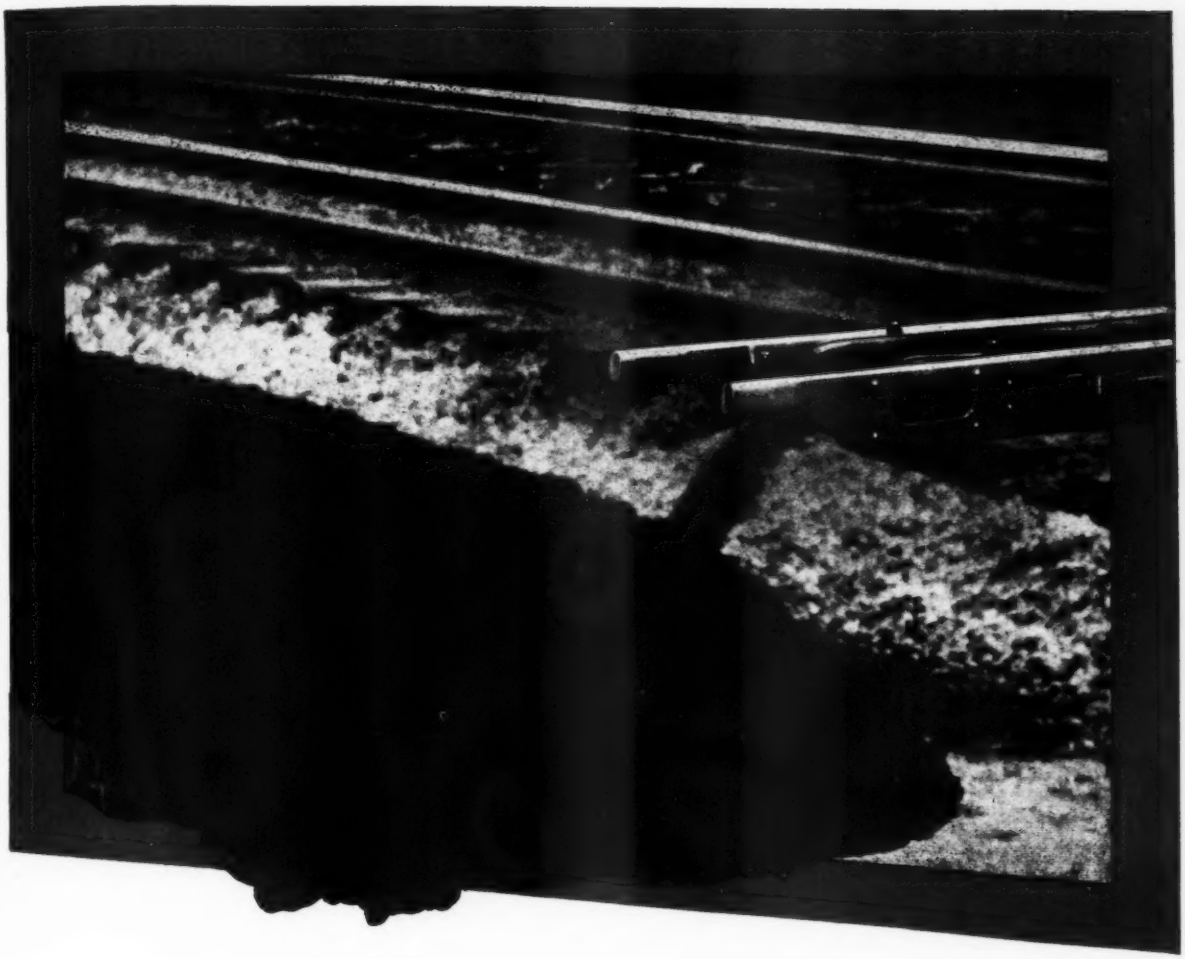
The true cost of American Bosch Magnetos is a *low* cost. They are known for dependability . . . for their ability to stand up for years under the heaviest demands — with only a minimum of care and adjustment.

American Bosch Magnetos are standard equipment on many of America's foremost engines. Users everywhere have learned to look for them as assurance of added dependability — when buying new equipment or replacing worn-out magnetos. Sold and serviced through a nation-wide network of Authorized American Bosch Service Stations. Write for free directory. AMERICAN BOSCH CORPORATION, Springfield 7, Massachusetts.

AMERICAN BOSCH

Super-Powered Magnetos

AUTOMOTIVE AND AVIATION ELECTRICAL PRODUCTS • FUEL INJECTION EQUIPMENT



MOUNTAINS (OF DIRT) FROM A "MOLE"

The mountain range above is only two feet high but it represents the peak of roadbed maintenance efficiency. Just a flick of the switch starts the new model McWilliams "Mole" Ballast Cleaner through the ballast of your road, sifting out unwanted cinders and dirt as it moves forward 3 feet per minute.

Manufacturers of The McWilliams "Mole" and RMC Rail Joint Packing

RMC

RAILWAY MAINTENANCE CORP. PITTSBURGH, PENNSYLVANIA

No. 222 of a Series

Railway
Engineering and Maintenance

SIMMONS-BOARDMAN PUBLISHING CORPORATION

105 WEST ADAMS ST.
CHICAGO 3, ILL.

Subject: Avoidable Complaints

June 1, 1947

Dear Railway Supply Readers:

My letter this month is addressed especially to you, and the importance of the subject raised will be clear, and appreciated, I am sure.

With our February issue of this year we started presenting a "Products" insert in each issue of Railway Engineering and Maintenance, containing a couple of permit-stamped, addressed post cards for the convenience of railway men in requesting literature or special information concerning any of the materials, machines, tools, or other products—your products—referred to anywhere in the issue—editorial or advertising pages. Such an insert, you will note, is presented in this issue. The response from these men, as many of you know from the inquiries that have been turned over to you, has been highly favorable, indicating that a valuable service is being rendered both to railway men and to you in the railway supply field. But there have been a few repercussions.

Most of you to whom we have directed these inquiries have handled them in your usual tactful and constructive way, and have complied with the requests made in the spirit of performing a real service. But some few of your group, according to word reaching us, have been a bit too aggressive to suit some of your railway friends, and have, figuratively, charged into their offices, with order book in hand, instead of the information requested—causing some embarrassment.

We know that you want railway men to use this service to the fullest extent, and agree with us when we question that they will continue to do this unless they can be assured that they will not be subject to embarrassment or high-pressure salesmanship. Maybe it would be well if those making inquiry would state specifically if their desires are limited to mail-matter only, thus saving your time, because we are sure that you do not want to make unnecessary calls, especially if such calls are not desired or appreciated.

On the other hand, with so many railway officers notable for their cordial relations with supply men, most of you know that you are welcome at their offices whether specifically invited or not. In fact some railroad men are of the type that would be offended, or feel neglected, if they did not receive a follow-up call to their inquiries, even through the information requested could be readily furnished by mail.

All this will be perfectly clear to you seasoned men in the railway supply field. You need no tips on how to conduct your business. However, you may find it desirable to be sure that any inexperienced, over-zealous or over-aggressive newcomers in your organizations realize that service necessarily goes hand in hand with sales, and in many cases may well precede sales for best relationships and results.

Sincerely,

Neal D. Howard

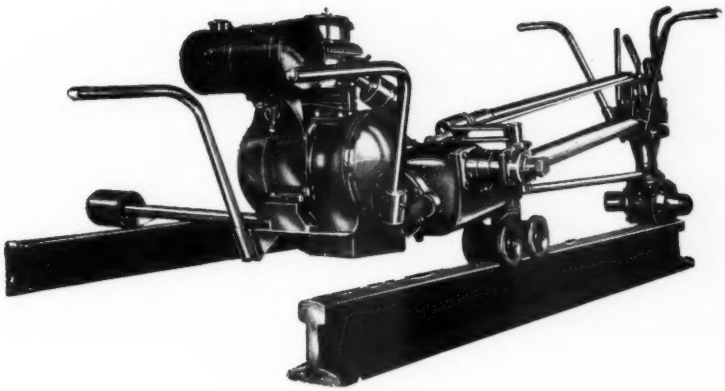
NDH/cd/ag

Editor

MEMBERS: AUDIT BUREAU OF CIRCULATIONS AND ASSOCIATED BUSINESS PAPERS, INC.

Savings effected by using

Raco Power Track Wrench



Mr. A. says they could not get along without their Raco Power Wrenches as they have eliminated a lot of joint trouble, greatly reducing maintenance costs.

He says that though there is a great saving in tightening by machine over hand methods, still **the greater saving, by far, is in reduction of maintenance from former figures.**

OTHER RACO MACHINES: Raco Tie Boring Machine, Everett Power M-W Drill

RAILROAD ACCESSORIES CORPORATION

CHRYSLER BUILDING • NEW YORK

Men and Machines MAKE PERFORMANCE ON THE JOB COUNT

Motor Car Maintainer—Physician to Maintenance Transportation. Like the Chinese Doctor, he gets paid for keeping his patients well.

Giant Moguls, flashing Diesel-powered Streamliners thrill the imagination, but basic to their magnificent performance is the proper maintenance of roadbeds and signal equipment.

Transportation for the great army of men who keep our railroads safe is of vital importance—so important that specially trained men are employed to keep those railway motor cars in perfect condition.

Railway Motor Car Maintainers appreciate Fairmont Motor Cars. Their simple, sturdy construction, easy accessibility, and dependable performance make the Motor Car Maintainer's job easier—fewer replacements, greater service.

FAIRMONT RAILWAY MOTORS, INCORPORATED
Fairmont, Minnesota

Fairmont Motor Cars

Riding Comfort with Plus Service

Fairmont M19 — Series Inspection Car. Dependable transportation — carries up to four men comfortably.

Fairmont
RAILWAY MOTOR CARS

Performance ON THE JOB COUNTS

OF ALL THE CARS IN SERVICE TODAY
MORE THAN HALF ARE FAIRMONTS

Railway Engineering and Maintenance

NAME REGISTERED U. S. PATENT OFFICE

JUNE, 1947

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Editorials - **575**
Postwar Progress—Timber Salvage—Tests

Long Rails for Transfer-Table Pit Fabricated at Night - - - - - - **577**
Describes the pressure welding and installation of six 1160-ft. lengths for use at the Missouri Pacific's shops in Sedalia, Mo.

Trestle Has Laminated Members - - - - - - - - - - - - - - **579**
Tells of a test installation on the Southern Pacific in which the caps and stringers are of glued, creosoted material

Rail Testing—Has Seen Many Developments in Relatively Few Years - **580**
T. B. Thompson recounts the history of rail-flaw detector units and describes the Illinois Central's program for this work

Bridge Timber Salvaged Cheaply by Old Sawmill - - - - - - - - **584**
How one division on the Wabash reclaims its salvaged material, cutting it into smaller sizes, for use in platforms, stock pens, etc.

Restores Pipe-Line Capacities With Acid Solvents - - - - - - - **587**
The Rock Island has used this method with great success to increase the rate of water delivery to locomotives, as this article describes

Four Men Killed in Track Car-Train Collision - - - - - - - - - - **589**
An abstract of the I.C.C. report of its investigation of an accident on the Chicago, Milwaukee, St. Paul and Pacific near Cedar Falls, Wash.

Should You Use a Larger Wire Rope? - - - - - - - - - - - - **590**
By regrooving the sheaves of a shovel for a larger cable, of preformed material, one contractor greatly increased the efficiency of the unit

Efficient Operation of Motor Cars - - - - - - - - - - - - - - **591**
In No. 13 of a series, G. R. Westcott points out the advantages of long service life, outlining methods of increasing track-car efficiency

What's the Answer? - **594**

Keeping the Right of Way Clean
Diesels' Effect on Bridges
Lighting in Waiting Rooms
Fire-Retardant Stock-Pen Lumber
Training Trackmen as Foremen
Plowing Fire Guards
Hazards of Back-Siphonage
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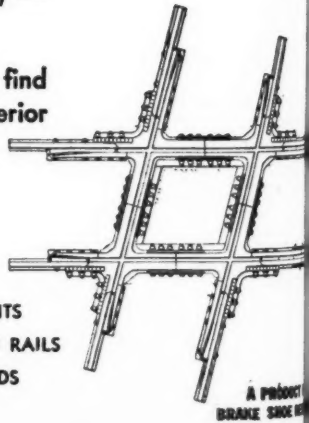
RAILROADING TESTS A METAL'S SOU

Racor Quality and Racor Engineering Ingenuity

REDUCE MAINTENANCE COSTS • PROVIDE MAXIMUM SAFETY • SPEED TRAINS ON THEIR WA

Speeding tonnage!! Incredible battering impact!! Routine punishment taken by Special Track Construction — yearly — daily — Yes, hourly.

Here in RACOR Manganese Steel Crossings, you will find That quality of metal, That production ingenuity, That superior design from years of research — which mean added safety, lower maintenance costs and a higher efficiency in speeding your trains on their way.



A PRODUCT BRAKE SHOE

RACOR TRADE MARK REGISTERED

Pioneers in the development and manufacture of

DEPTH HARDENED CROSSINGS	SAMSON SWITCH POINTS
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Railway Engineering and Maintenance

Postwar Progress—

Railroads Handicapped by "Profitless Prosperity"

Much is being said these days about the failure of the railroads to "deliver," as promised, radical improvements in postwar passenger and freight service. Particularly acute has been the criticism of freight service and the shortage of freight cars that has developed. To the extent that the railroads haven't "delivered" and can't meet shipper demands, the public and the shippers are justifiably disturbed, but instead of being overly critical of the railroads, they might well direct the major part of their criticism more properly to the conditions that have made it impossible for the railroads to "deliver" and meet all requirements for service.

With freight service the principal target of complaint—and without attempting to minimize the seriousness of it—just how badly have the railroads been doing in rendering this service? To answer this question, consideration must be given to the heavy load that has been imposed upon the war-weakened roads, a load which has greatly exceeded the predictions of business, industry and the railroads at the close of the war —with practically all roads reporting net ton-miles of freight traffic higher than in any prewar year, exceeding previous peaks of the late Twenties all the way up to as much as 140 per cent. In fact, 1946 was a record peacetime year for the railroads in revenue ton-miles, the 592 billion ton-miles hauled in that year being only 20 per cent below the traffic volume of the war year 1944—the peak year of all time.

"The most wonderful performance in the history of American railroading" was the unqualified characterization of the feat of the carriers represented in the record loading of 931,766 freight cars during the week ended October, 1946, by Colonel J. Monroe Johnson, director of the Office of Defense Transportation. In that week, car loadings exceeded by 16,000 the loadings handled during any week of the war, and were the highest since the week ended October 30, 1930. Earlier, Colonel Johnson had predicted that the railroads couldn't handle more than 925,000 cars a week. And more of the impossible was to come, for the very next week after the "most wonderful performance" week, saw total loadings of 942,257 cars.

During the first 14 weeks of 1947, a total of 5,157,318 box cars were loaded, an increase of 1.6 per cent over the corresponding period of 1946, and this was accomplished with an average of 6,392 fewer serviceable box cars per month than in the corresponding period of 1946. These figures certainly don't indicate that the railroads have slipped seriously in efficiency.

And what about improved freight service in the matter of speed of deliveries? To this question the railroads can point with pride to "across the board" restoration of manifest freight trains curtailed during the war years. As of March 18, 1946, for example, the western roads affected a general reduction of 24 hours in their transcontinental schedules, and some lines have since cut additional hours between the western gateways and the Pacific coast, with intermediate points benefiting proportionately. Twenty-five roads have reported 75 separate "overnighters", providing actual first-morning arrival of freight trains and delivery of lading at destinations 300 mi. or more distant—an appreciably larger number of such trains than existed in 1940. Again, no sign of not "delivering".

And what about new equipment and improvements to the fixed properties to improve service? In 1946, the Class I roads ordered 856 Diesel-electric, 55 steam and 8 electric locomotives, and 97,730 new freight

cars; spent approximately $243,000,000 for capital improvements to their fixed properties, and an estimated $1,160,000,000 for the maintenance of their ways and structures. Currently on order are 582 Diesel-electric, 52 steam and 6 electric locomotives, and approximately 100,000 new freight cars; and current roadway improvements programs are running ahead of last year.

These indices of progress to the contrary, it is admitted that the railroads have not met their postwar promises in full, and while many factors are involved, including shortages of materials, labor unrest, and increased labor and material costs, the principal deterring factor is stated succinctly in the Freight Progress Annual of the Railway Age—May 17 issue—when it says that the railroads have been confronted with a "Profitless Prosperity". In other words, the railways, in the face of unprecedented costs for labor and materials, and high taxes—and in spite of record peacetime freight traffic and the recent freight rate increase of 17.6 per cent—are not being allowed to earn a return which will permit adequate expenditures from earnings, or which will attract the necessary amount of outside capital, to make the improvements essential to the kind of postwar service the railroads had hoped to be able to render.

With the railways, it is a shortage of *dollars* that is holding up their "delivery" of super service. This accounts for the present aggressive efforts on the part of railway managements with the various regulating bodies of the country, the shippers and the public, seeking to be allowed to earn approximately six per cent on their investment through rate adjustments, lower taxes and relief from unjust discrimination.

Criticism to the contrary, marked progress has been made by the railroads in the postwar period to date, but if the roads are to meet all of the requirements of industry and the country as a whole in these times of prosperity and large demands, they must be allowed to share adequately in that prosperity.

Timber Salvage—

Are Maximum Possibilities Being Realized?

WHEN old timber structures are retired a common practice among the railroads is to salvage whatever members are found in a fairly sound condition, with the idea of using them later for making repairs or for other purposes. Frequently the practice is to classify the salvaged material according to the various sizes and then to hold it until a need is found for one or more of the sizes available. Usually there is little resawing of the salvaged material except that involved in cutting the pieces to whatever lengths may be required when they are reused.

While this practice indicates a commendable effort to economize by using old material, it has certain limitations. In the first place, without more or less reprocessing, salvaged timbers are applicable for use in only certain types of structures and for only certain purposes. Also, unless some processing of the salvaged material is contemplated, it is apparent that certain damaged pieces, which otherwise might be resized for further use, must be scrapped altogether.

On one division of the Wabash, as described in a feature article in this issue, a long step forward from previous practice has been made by installing a sawmill by means of which salvaged material is being resawed as necessary to adapt it to a wide variety of uses and applications. Thus, a much higher degree of flexibility and economy than heretofore has been injected into the timber-salvage operations on this division.

Installation of the sawmill was originally motivated by the shortage of new lumber, with the consequent need of making salvageable material go as far as possible. But the results have been so satisfactory, with large economies and other important advantages being realized, that continued use of the sawmill, even after the lumber supply improves, is considered justified. Here is a practice, requiring a minimum expenditure, that seems to be worthy of careful investigation by other railroads.

Tests—

Are They Being Handled to Best Advantage?

ON ALMOST every railroad at any given time there are various service tests under way involving the observation of tools, equipment, appliances and methods used in the maintenance of construction of tracks and structures. A relatively small number of these tests are of a cooperative nature, that is, they are made under the auspices of some group outside the railroad itself, possibly a committee of the American Railway Engineering Association. However, there is reason to believe that a great majority of the tests being made are what might be called local in nature. In this category are those tests that are instituted by single roads, or by individuals on particular roads, to obtain information regarding the efficacy of new ideas or developments.

Obviously the effort and money invested in any test is at least partially wasted (1) if the test is not observed carefully and followed to a conclusion, and (2) if the results are not publicized in some manner so that all interested parties may benefit by them. With reference to the so-called cooperative tests, both of these requirements are usually fulfilled. But what about the vastly larger number of local tests? How frequently are such tests undertaken with the best of intentions and then neglected or abandoned due to loss of interest? How often are tests of this type observed only sporadically or perfunctorily, with no record being made of the results. If a record is made, how frequently is it "buried" in some office file rather than being handled in such a manner that it will become widespread knowledge so as to be of benefit to others?

These are only a few of the things that can happen to test installations which, if handled properly all the way through, might produce information of tremendous value to the maintenance field as a whole. Assurance that this objective will be realized can only be had if all worth-while tests are carried methodically to a conclusion, with the findings being given the widest possible circulation consistent with their value and importance.

General View Through the Long Transfer-Table Pit at Sedalia, Showing Workmen and a Crane Lifting the Welded Rails Into Position Alongside the Old Rails. Insert—One of the Pressure Butt Welds

Long Rails for Transfer-Table Pit Fabricated at Night

WHEN the Missouri Pacific recently installed continuous butt-welded rails in the long pit of the locomotive transfer table at its Sedalia, Mo., shops, a major problem was presented by the lack of sufficient tail room at either end to permit the welding of the rails into full lengths for installation as units. Another problem arose in the fact that the table was in almost continuous use during each daylight shift and that any attempt to handle the long rails into the pit during this period would have severely hampered shop operations. For these reasons it was decided to carry out the work of fabricating the long rails and of moving them into the pits during the early evening and night when the use of the table was at the minimum.

Pit Is 1160 Ft. Long

The shops at Sedalia are the largest on the Missouri Pacific, the facilities at this point including the road's principal locomotive erecting, boiler and blacksmith shops. The erecting shop is served by a transfer table, operating on six rails in a continuous pit 1160 ft. long. With the advent of heavier power, these rails, relatively light in section, became overtaxed, and it was considered desirable to replace them with rail of a heavier section. Furthermore, because of the advantages to be derived through reduced maintenance, it was decided to substitute continuous welded rails for the jointed construction of the existing arrangement, employing the Oxweld pressure butt-welding process in the welding work.

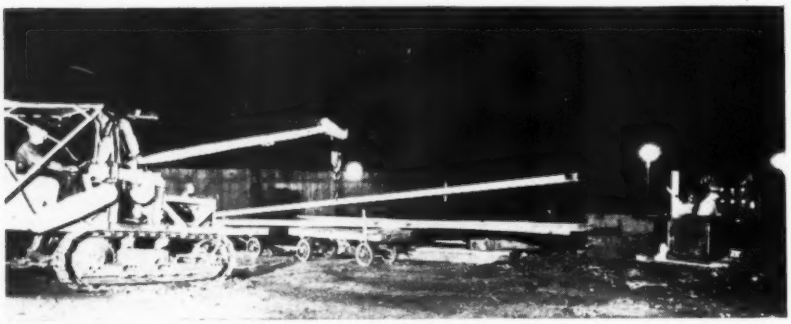
Because of the lack of sufficient room at either end of the pit, as already pointed out, to permit the welding of the continuous lengths before their installation, it was decided to locate the welding equipment at one end of the pit and to move the continuous rails into the pit, one rail length at a time, as each joint weld was made. However, if done during the day, such a procedure would have severely restricted the use of the transfer table,

A Cropping Plant Was Set Up to Remove the Ends of the Rails Prior to Welding. This View Shows the Plant in Operation

and would have, in consequence, disrupted the work schedule of the shop. Accordingly, plans were made to fabricate the long rails during the period from 4 p.m. to midnight, when the shop was virtually shut down. In the plan, the long rails were to be formed into six strings 800 ft. long, and six strings 360 ft. long, one of each length to be combined to form the 1160-ft. pit rails. Finally in place, the long and short sections were to be hand butt-welded together.

Secondhand 90-lb. rails were supplied for the work and unloaded at a point about 300 yd. from the welding site, where a cropping plant was set up to remove the worn ends of each rail, including the bolt holes, to provide a smooth end surface for the pressure welding. The cropping plant was arranged to cut two rails on each pass of the saw, a jigging fixture being used to hold the rails in parallel. After cropping, the rails were loaded onto two four-wheel yard trucks by means of a crawler-type tractor with a boom attachment, which was then used to tow them to the welding site, where they were unloaded onto the racks serving the table of the welding machine.

Prior to welding, the section of each rail falling within the limits of the clamps of the butt-welding machine was flame cleaned to remove old oil, grease and rust. When the weld at each joint was complete, the rail was moved forward to the normalizing machine in the Oxweld set-up. Between the welding machine and the normalizing machine, the weld was passed over a waist-high platform where the upset metal at the weld was trimmed off by a workman using a hand cutting blowpipe.



Above—Rails Were Handled From the Cropping Plant to the Welding Site on Yard Trucks, Towed by a Crawler Tractor

Left — The Finishing Operators Were Located in Bell Holes, Deep in the Pit Floor

Below—One of the Continuous Rails Being Moved From the Welder Into the Pit. Notice the Winch Shown at the Left, for Moving the Rails

Special Conditions

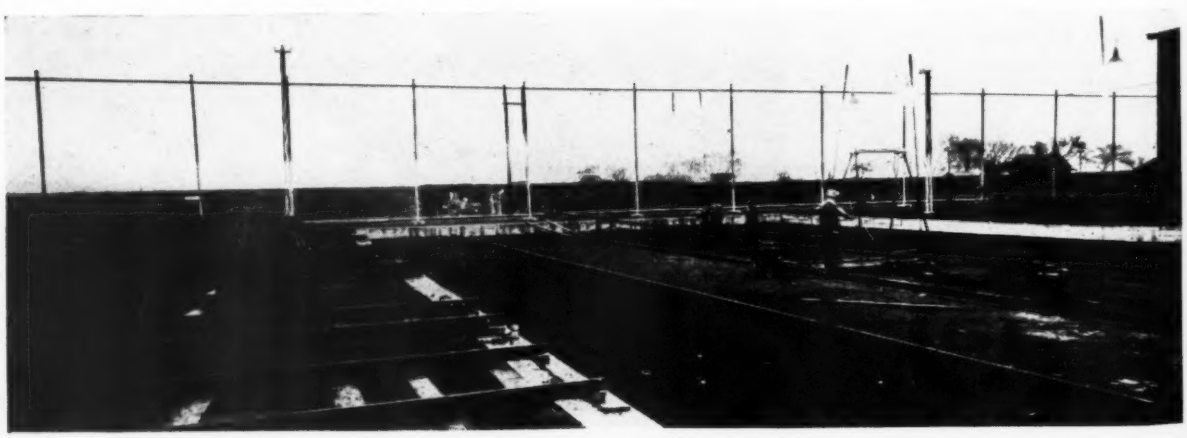
On leaving the normalizing machine, the welded rail was moved forward into the pit on low supports to permit finish-grinding operations on each weld, and then the rail was moved forward on rollers that were barely above the base of the pit. Directly at the grinding stations, bell holes were dug in the floor of the pit to permit grinding at a comfortable, waist-high position.

The lack of tailroom made it impractical to locate a winch at the end of the pit near the welding machine to pull the rail into position, as would be the normal practice, so the winch was set up at one side of the pit, between a pair of shop entry tracks, near the welding machine end, and was used to pull the long rails by means of cables and a series of snatch blocks. This location made it unnecessary to move the winch to clear the daylight operations at the shop and also permitted easy signaling between the welder and the winch operator. Furthermore, by changing the position of the snatch blocks, the long strings of rail could be moved in either direction as desired.

Installing the Long Rails

After the welding of the long strings was completed, four days with a crew of 16 men were required to lay and fasten the long rails in place and remove the old rails from the pit. The actual installation was accom-

(*Continued on page* 588)



The Structure Incorporates Creosoted, Laminated Caps and Stringers

Trestle Has Laminated Members

TO TEST laminated heavy timber construction under actual service and weather conditions, a two-span ballast-deck trestle, using creosoted laminated caps and stringers in its construction, was put in service on the single-track main line of the Southern Pacific, near Durmid, Cal., in desert country on the eastern shore of the Salton sea, late in 1946. In all other respects this trestle was built in accordance with this railroad's usual standard for E-70 loading, employing seven-pile bents, six stringers centered under each rail and continuous throughout the two spans; and a single stringer, also continuous for the two spans, on the ends of each cap to give end support to the ballast-deck planking. Thus, the structure in question has 3 caps and 14 stringers.

All caps were built up of nine horizontal laminae so as to measure 13½ in. by 14½ in., and are 16 ft. long. Each lamina was formed by gluing a 4¾-in. board along one edge to an 8¾-in. board. These glued joints were then lapped, or staggered, when the nine laminae were glued together to form the cap. Each stringer measures 7¼ in. by 17¾ in., and consists of 11 horizontal laminae. All material used in both caps and stringers were Douglas fir dimension lumber, kiln dried at the Portland, Ore., plant of Timber Structures, Inc., where the lamination work was also performed. No detailed moisture measurements were made after kiln drying, but the average moisture content is reported to have been 15 per cent.

In forming the laminated members, the flat surfaces of the boards were coated with Cascophen LT-67 glue, which is an intermediate-temperature-setting liquid, phenolic resin, and the laminations were held under clamp pressure of 100 p.s.i. for 24 hr. at approximately 70 deg. F.

Preservative Treatment

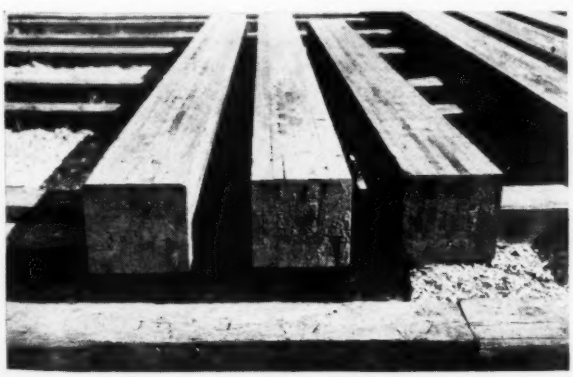
After lamination, the timbers, none of which were incised, were treated with creosote at West Oakland, Cal., plant of the Southern Pacific. In this process the members were included in two charges, each made up of both large and small material, and were given a full-cell treatment with straight creosote. One charge consisted of 12 hr. boiling under vacuum at 190 deg. F., 15 hr. under 125 p.s.i. pressure at 180 deg. F., and 1 hr. final vacuum. The other charge received the same treatment except that the pressure period lasted only 9 hr. 5 min.

Since both charges included other large and small material, the gross injection and net retention are not known. However, in general, it is customary at the West Oakland plant to inject 12 lb. per cu. ft. in material over 4 in. thick; but the pressure period is never held over 15 hr., and it is known that large timbers seldom take over 10 to 10½ lb. per cu. ft. in that period.

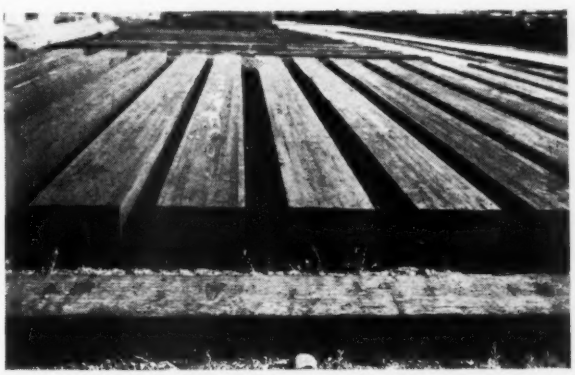
This preservative treatment produced very little evidence of delamination. What little there was occurred in the caps, along the vertical glued edges of the two pieces making up each individual lamina, where it would have no effect on the strength of the member in bending.

Subsequent observations of the laminated members since the installation have shown that there are still no delaminations of the stringers, and that the minor separations in the caps are no greater than they were immediately after treatment.

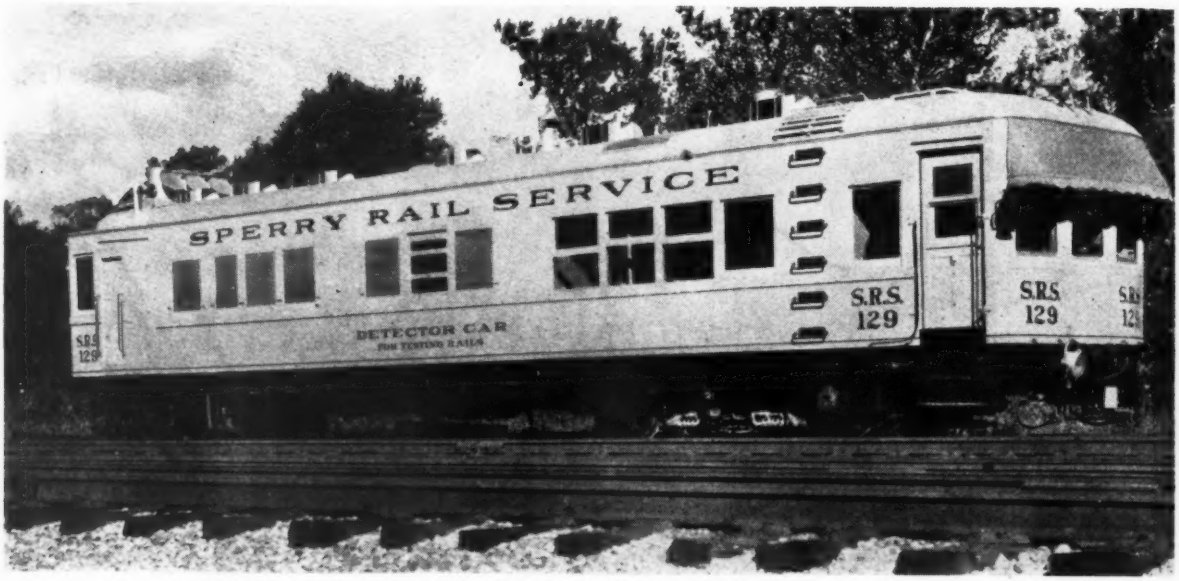
This article is adapted from the report of the Special Committee of the American Wood-Preservers' Association on Preservative and Fire-Retardant Treatments of Laminated Members, presented before the annual meeting of the association in Portland, Ore., on April 22.



The Caps, as They Appeared After Treatment, Show That Small, Unimportant Separations Did Occur at a Few Points Along the Glued Edges of the Two Boards Forming Each Lamina



That the Laminated Stringers, Given a Full-Cell Treatment with Straight Creosote, Did Not Show Delamination, Is Indicated by This View of Some of the Treated Members



One of the Sperry Fleet of Rail-Flaw Detector Cars

Rail Testing—Has Seen Many D

In this article, which is an abstract of a recent address before the Maintenance of Way Club of Chicago, Mr. Thompson, formerly in charge of detector car operation on the Illinois Central, discusses the origin of rail testing, developments in testing equipment, and the various types of equipment in service today. He also describes the essential features of rail flaw detection on the Illinois Central, which tests some rails as frequently as four times a year, and sees the need for continued testing in the future, even though the universal use of control-cooled rail may eliminate transverse fissures resulting from shatter cracks.

By T. B. THOMPSON

Special Engineer
Illinois Central, Chicago

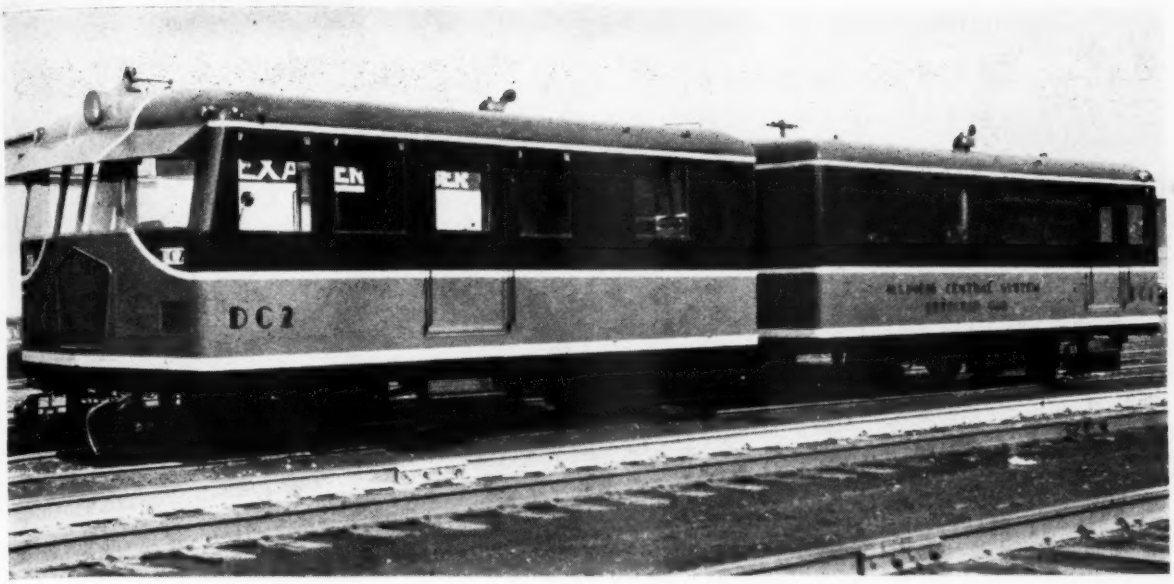
EFFORTS to develop a device for the detection of transverse fissures have been going on since 1913. Mirrors were constructed on brackets that could be moved along by hand, showing in their reflection any breaks that might be visible beneath the rail head. This method proved slow, laborious, and had the further objection that detection of failures was impossible until the development had reached the contour of the rail head.

The Bureau of Standards, in 1915, under the direction of Dr. Burroughs, attempted to develop a practical apparatus for testing rails, consisting of a magnetizing solenoid surrounding the rail, with a search coil and sensitive meter to detect any change in the total magnetic lines of force, which vary as irregularities in the rail head material are encountered. This has been called the total flux method of detection, and was subsequently investigated by two railroads and a steel company. It required about 25 min. for a complete test of one rail, and, while the apparatus was highly sensitive and accurate to internal defects, it also was sensitive to hard spots, gag marks and other minor metal conditions that were not in any way dangerous. Finally, it was abandoned as impractical because there was no way of determining the relative danger of the indications given.

M. Suzuky, an engineer in the research office of the Japanese government at Tokyo, developed a device similar to the one of Dr. Burroughs, but to be used on rail in track. His apparatus had a coil connected to a sensitive meter operating in an active magnetic field. This has been called the flux-leakage method of detection because it depends on the magnetic flux leaking out, due to an internal separation, and being deflected through the coil and meter circuit. Claims were made that about 3/5 of a mile of track could be tested in an hour, but this device, like Dr. Burroughs, was unable to separate the fissures from the false indications.

X-rays have been proposed as a method of internal inspection; however, for the present they are dangerous to use without adequate protection and unsuitable for field work.

Magnaflux, a method used in testing shafts, castings, etc., for internal separations, has been suggested. Briefly, this method consists of magnetizing the piece to be tested and then dusting it with ferro-mag-



One of the Illinois Central's Residual Magnetic Detector Units

y Developments in Relatively Few Years

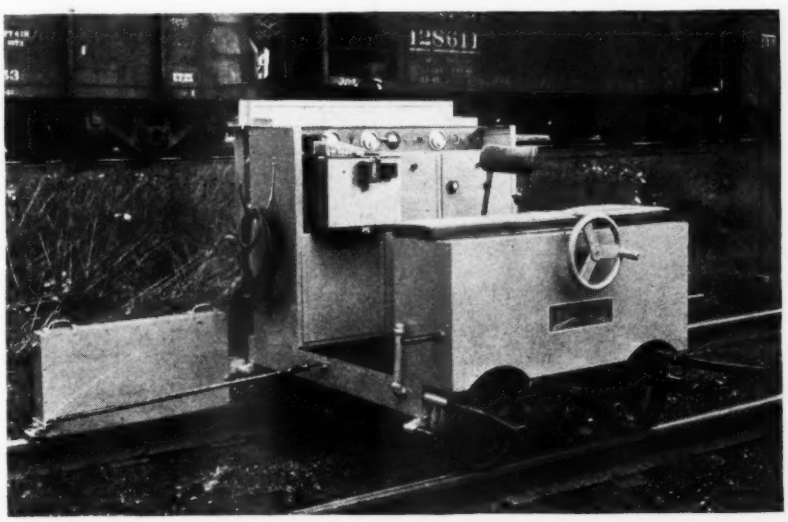
netic filings especially treated to reduce friction, or immersing it in a solution containing finely divided filings in suspension. Discontinuities of metal are shown by the adherence of filings near the separated portion. Fissures are generally too deep in the rail for this method to be effective, and it is hard to see how a practical application could be made for field testing.

Sperry Car Developed

In 1926, the late Dr. E. A. Sperry, a distinguished engineer and inventor, proposed a drop-of-electrical-potential method of testing rails. In this method, a current of about 2500 amp. or more, at low voltage, was to be forced through a portion of the rail, and by continuously moving a set of conductors carrying the current the entire rail was to be energized. The resistance effect of discontinuities in the rail head would be detected by a pair of brushes to pick up this minute difference in voltage and to transmit it to a suitable electronic amplifier to increase the impulse sufficiently to operate pens for a paper tape record. The plan also envisioned an automatically-operated paint gun to produce a paint spot on the rail at the location of the defect.

Since this method was based on a sound, tried and proven principle, the American Railway Engineering Association recommended that Dr. Sperry be authorized to build a car embodying the equipment required, and agreed to assume the costs. Subsequently, in 1927, such a car was built, which performed well enough in the laboratory, but which, when placed in road service was found to be impractical because the brushes could not work through the resistance effect of the hardened running rail surface. The apparatus was redesigned by replacing the brushes with a search coil, which depended on the field distortion caused by incongruities in the rail head instead of the difference in voltage.

The first actual service run was completed in December, 1928, over



This Car, Developed by Teleweld, Inc., Is the Latest Addition to the Detector-Car Family

two main tracks of the New York Central between Beacon, N. Y., and Rensselaer, a distance of 166 miles. Credit for the development of the Sperry-type car is due jointly to Dr. Sperry and the Sperry Development Company, the Association of American Railroads, the American Railway Engineering Association, and the New York Central. This car proved so successful that shortly after being put in service another one was built to be owned and operated by the Sperry Company. This second car was the forerunner of the present Sperry Rail Testing Service which operates a fleet of cars available for service to the railroads.

Thus the detector car was born, and as full appreciation of its potentialities became recognized by railroad managements, the demand for service soon exceeded the supply. In spite of the relatively large number of cars made available by the Sperry Company, many railroads had to wait their turn for testing.

Residual Magnetic Method

To meet the need for increased testing service, the Association of American Railroads again went to work to develop a different method of flaw detection. This resulted in the residual magnetic car, which was invented by W. C. Barnes, engineer of tests of the Rail Investigation Committee, and H. W. Keevil, assistant engineer, both of the A.A.R. Mr. Barnes has continued to direct the rail testing program of the association and the residual magnetic detector car development, with the assistance of Mr. Keevil, who was the operator of the original Sperry car.

The first residual magnetic car was put in service on the Denver & Rio Grande Western on May 3, 1939, and in the summer of 1941 the board of directors of the A.A.R. authorized the building of another residual car, and also made the entire development available through license to any member road wishing to build and operate its own car. Since then six railroad-owned cars have been built and put in service, and others are authorized.

The residual magnetic principle of detection is relatively simple, although its final application in the form of a rail detector car becomes somewhat involved. This principle can be demonstrated best by rubbing an unmagnetized steel bar with an ordinary magnet. A small compass will then indicate that one end of the bar is a north-seeking pole while the other end is a south-seeking pole. The portion between the two poles seemingly does not disturb the compass a great deal. Next, drill holes, notch with a saw or crack the bar in some manner and the compass becomes greatly disturbed as it passes near these breaks due to the presence of local residual magnetic fields. A coil of wire connected to a sensitive meter when moved along the bar produces a weak voltage each time it passes through one of these fields. The coil is known as a search coil because it "searches out" these local residual fields. Replace the hand magnet with six electro-magnets, three to the rail, stretch the steel bar out into 39 ft. lengths weighing 112 pounds per yard or more; connect the search coil to a suitable electronic amplifier instead of the meter, the output of which feeds into a relay controlling a magnetic pen and paint gun, instead of a loud-speaker; mount the entire apparatus on a car with a power unit so it can be moved over the rails from 5 to 7 m.p.h., and you have a residual magnetic detector car.

Hand Testing With Sperry Equipment to Verify the Existence of an Internal Defect

Wood Preservers Inspect Treating Plants

NEARLY 500 members and guests of the American Wood-Preservers' Association, including many railroad men, attended the annual convention of the association at Portland, Ore., April 22-24. The program included visits to several treating plants. This picture shows some of the group at the plant of the Chemonite Wood Preserving Company, Portland.

Actually, when working, the cars are locating local residual fields in the rail head, many of which are caused by internal defects. However, some indications result from minor surface conditions that are not dangerous. Therefore, the operator must watch the rail surface, the base of the rail where the magnetic paint gun marks each time the search coil encounters a residual field, and glance at the tape to see that each magnetic pen stroke corresponds to a paint gun spot. At the same time he must decide if the indication on the tape is caused by a minor surface defect or an internal separation.

Areas in which considerable locomotive driver slippage occurs, due to starting and stopping, cause the operator considerable trouble. A good pair of eyes and no imagination are essential in an operator. Fissured rails never "get well" and an operator's mistakes invariably show up behind the car, so an operator cannot afford to make mistakes.

To confirm his judgment as to whether an indication on the tape is due to a surface irregularity or to a dangerous internal defect, an operator stops the car and causes a heavy current to be run through a section of the suspected rail. Any internal separation acts as an obstruction to the flow of eurrent through the rail very much like a stone in a small stream will deflect the water from its main course. This causes a piling up of the lines or force on one side of the defect and produces a voltage difference at the separation which is easily located by means of a sensitive milli-voltmeter. Any sudden rise in the meter indicates a defect, the percentage of which can be calculated fairly accurately from the meter reading. Internal defects from 5 to 100 per cent of the area of the rail head are found.

Policy on Illinois Central

The Illinois Central has been using detector cars since 1929, employing both Sperry and Association of American Railroads' cars on a rental basis. However, on January 8, 1943, it placed in service a company-owned residual magnetic car, and subsequently, on April 26, 1945, it placed in service a second magnetic car, built in its Burnside shops.

Because of the large investment in this equipment and the need for testing the more important lines three or four times a year, both cars are operating on a seven-day-week basis, using four men to the car. Actually, only three men are on duty at any one time, each man working for a period of 24 days and then going home six days out of each month.

Both cars are averaging about 24 testing miles a day, and together they tested approximately 16,000 miles of track during 1946. Results from the above program have been highly gratifying as measured by a susbtantial reduction in train accidents from transverse fissure rail failures,. which were reduced from eight in 1941 to none in 1946.

New developments are continually being added to both cars as soon as their worth has been demonstrated. For instance, since 1943 the No. 1 car has had improved amplifiers added twice, giving a cleaner record and making it possible to locate many fissures in the vicinity of and under wheel burns which had formerly been missed. In addition, two complete sets of improved wheels have been applied, requiring less maintenance and resulting in fewer days tie up for the cars in shops. Demagnetizers for removing residual magnetism from the rail following each test have also been added, as well as many other items. These improvements, while costly, have kept both cars modern and have resulted in our securing an average of six or more testing miles per day per car, as well as an overall more efficient job.

To minimize delays from breakdowns, a complete supply of spare parts for our cars has been stocked at strategic points along the system. Furthermore, each car has a stock of small parts on board at all times and is equipped with machine shop tools for use when minor machine work is required. Breakdowns on a rail detector car are handled like derailments on the main line; the crew goes to work and does not quit until the car is ready to go again.

Test Tracks for Cars

Test tracks have been constructed at Wildwood, in the Chicago Terminal area, and in the Memphis terminal area, laid with rails containing fissures whose location and size are known. Both cars are periodically checked on these tracks for efficiency of their detecting equipment.

The latest member to the detector car family is one developed after considerable experimentation by Teleweld, Inc., Chicago, a car which is said to work in a sustained magnetic field. Basically, this car is similar to other magnetic cars that have preceded it. Lightness and provision for setting of car from the track to clear for trains are two of the special advantages claimed for this equipment.

Although developed originally for the detection of fissures, a number of other types of defects are found by detector cars. For this reason, it is difficult to see how the railroads can afford to be without this kind of inspection, even though there is reason to believe that when only control-cooled rail is in service, shatter cracks and the resulting transverse fissures may be a thing of the past.

Laying Rail on the Pere Marquette with a Caterpillar Tractor and a Tractson Side Boom

Bridge Timber S

Left—The Sawmill, Belt-Driven From a Wheel Tractor, is Located at Division Headquarters Where Secondhand Timbers for the Entire Division Are Accumulated and Stored. Below—By Means of a Conveniently-Located Hand Lever the Sawyer Controls the Moving Sawtable

PLAGUED during the war years by the increasingly short supply of lumber and its pyramiding price, we on the Wabash began to lay aside for future use many of the timbers that we removed from bridges or other structures either because of mechanical wear of the member or obsolescence of the entire structure. Some of this material would have been saved in accordance with our usual salvaging practices, but in view of the growing scarcity of new lumber, a much larger percentage of it was saved, without any specific knowledge at the time of how, when or where it might be used later. However, it did give us the assurance that if the supply continued to get shorter, we would at least have something with which to work.

By the end of 1946, we had accumulated at our division headquarters a considerable supply of ties and timber 8 in. by 8 in. by 10 ft., 8 in. by 12 in. by 12 ft., 8 in. by 16 in. by 14 ft., and 12-in. by 12-in. material of various lengths, together with other miscellaneous lumber. However, our acute need at the moment was for material to repair several freight platforms being ravaged by heavy trucking and to rebuild two large stock pens. As only a few of these timbers could be used for these purposes in their existing size and condition, we solicited proposals from several small lumber mills for the sawing of our second-hand material into specified sizes suitable for our needs. Since these mills were as short of lumber as we were, each would agree to do the sawing for 50 per cent of the ties. Obviously, such an arrangement was prohibitive under the circumstances, unless no other alternative could be found which would give us the most lumber possible from the material on hand.

Just such an alternative was found in a secondhand sawmill and tractor, which could be bought for $225 each. The savings that could be realized at this cost were obvious, and authority to purchase both mill and tractor was readily obtained. The unit was installed at our division headquarters where we assemble all of our usable secondhand bridge material, and where we have bridge men available for the operation of the saw.

This Freighthouse Platform, Including Understructure and Decking, Was Renewed with Lumber Resawed from Old Bridge Material by the Sawmill at Montpelier

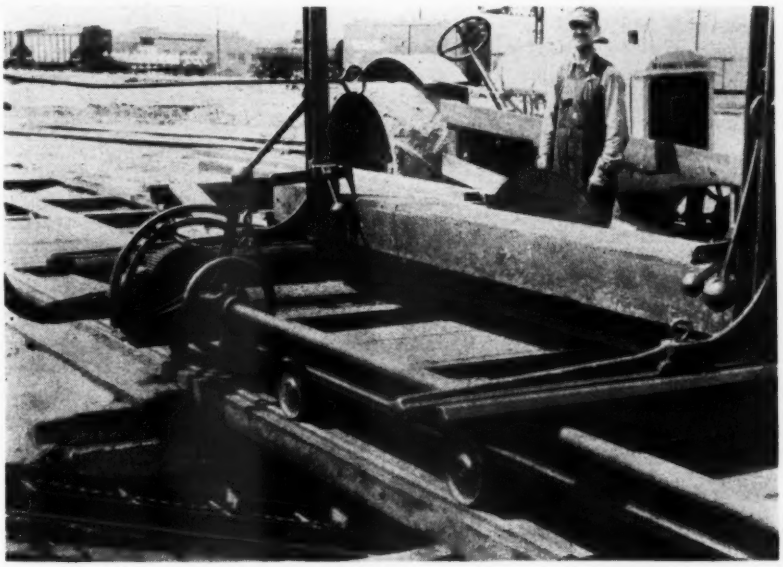
The Equipment

The sawmill unit, manufactured by the Atkins Saw Company, is equipped with a wedge-tooth circular saw of 42-in. diameter, and No. 10 gage, which makes a cut ¼ in. wide. The complete outfit also includes a saw table, on which the timber to be sawed

Salvaged Cheaply by Old Sawmill

By B. M. BENNETT AND J. M. ERICKSON
Division Engineer and Supervisor Bridges and Buildings
Wabash, Montpelier, Ohio

In this article, originally written as an answer to a question which appeared in the What's the Answer department, these men describe their use of low-cost, secondhand machinery to process old bridge ties, caps, stringers and pile cut-offs into lumber. They show that, at relatively small expense, they not only convert otherwise useless scrap into valuable material in needed sizes not available commercially, but do it at one-fifth the cost of new material. They indicate that, while their method was adopted originally as an expedient to off-set the shortage of lumber, the benefits so far obtained would appear to warrant its continued use after the supply returns to normal.



Left—The Sawed Lumber Is Wheeled to a Storage Point on a Small "Off-Bearing" Truck Operating on Treated Timber Rails. Below—An Inclined Chain Conveyor, Shown at Lower Left in this View Carries the Sawdust Away as it Drops into a Pit

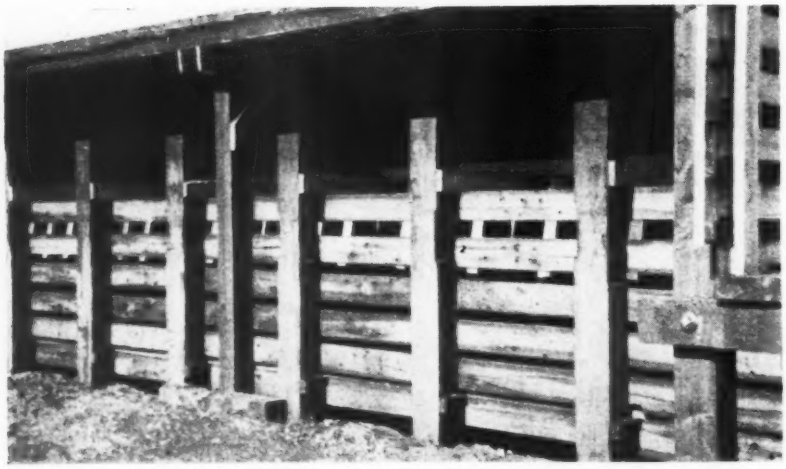
is clamped, and which is pulled back and forth by a cable operated by friction pulleys driven by the main drive shaft; an "off-bearing" truck for receiving the sawed lumber from the saw and carrying it away to be stored; and a chain conveyor to remove the sawdust.

This unit was set up on steel I-beams over a shallow concrete pit, built to accommodate the inclined sawdust conveyor. Treated timbers, to support the saw table rails, were laid horizontally on secondhand ties. All the other equipment, including the rails for the "off-bearing" truck, was also made of treated timber. Because it was not expected that we would have enough salvaged material to keep the mill running all the time, we made the installation as simple as possible, yet adequate for its purpose.

The tractor purchased, which was to provide power to operate the sawmill, was a gasoline-driven McCormick-Deering, wheel-mounted, gasoline-driven unit, which had a good engine, a governor, and a 16-in. drive pulley, developing 50 hp. This tractor, which has steel-tired, cleated wheels, is also used for skidding and pulling the timber from the storage pile to the saw.

Only three men are required to operate the mill. One man prepares the secondhand material for sawing by pulling out the spikes and nails; another does the setting and sawing; and the third handles the sawed material. The man preparing the material must be careful to remove all spikes, bolts and other obstructions so as to prevent damage to the saw. The sawyer can assist materially in this regard by his choice of material from which to cut certain lumber sizes. For example, bridge ties that have been repeatedly respiked, and may have broken track spikes buried in them near the top surface, should be sawed into larger timbers, such as crossing plank and square material. Two or three boards can be cut from the bottoms of such ties, leaving about seven inches of the top where broken spikes may be.

The timber should be graded to the



Lumber Reclaimed with the Aid of the Sawmill Is Being Found Admirably Suited for Use in the Reconstruction of Stock Pens

extent that the cleanest and best material is selected for cutting into the smaller sizes of lumber. Pile cut-offs are especially good for this purpose.

Since the sawmill was installed in September, 1946, it has operated only when material for sawing was available, yet it has already processed about 70,000 ft. b.m. of good, usable lumber. From this material we have constructed two unusually large stock pens, have repaired three large freight-house platforms, and have stored a large amount of crossing material and other miscellaneous items.

The savings realized from the use of this outfit have been very satisfactory, and certainly warrant our continuing its operating even after the lumber supply improves. To resaw 1,000 ft. b.m. of usable lumber costs an average of $18 for labor, $2 for fuel, and 50 cents for fitting the saws —a total of $20.50. Since it would cost at least $100 to purchase the same material, we save approximately $80. Therefore, in about six months we have saved $5,600 and, at the same time, have provided ourselves with material in sizes otherwise unobtainable.

Highly Flexible

The flexibility with which this sawmill can be used to obtain lumber to meet any of our specific needs is very advantageous. For instance, crossing plank is always in demand on our railroad, and we are now able to obtain the exact size of timber needed to fit the height of rail in track at any crossing. The installation of these timbers is easy in comparison with our previous method of using shims to raise undersized timbers to the proper height, and provides a much better crossing. In another case, we found it very satisfactory to saw old bridge ties into fence boards 1¼ in. by 8 in. by 10 ft. By setting the posts on 5-ft. centers, this 10-ft. lumber could be used to make a good fence without much waste.

The following sizes of material have, so far, been sawed from old bridge ties, stringers, etc.: 7 in. by 8 in. by 9 ft.; 1 in. by 8 in. by 10 ft.; 4 in. by 4 in. by 10 ft.; 2 in. by 4 in. by 12 ft.; 2 in. by 8 in. by 12 ft.; 6¾ in. by 8 in. by 12 ft.; 7⅛ in. by 8 in. by 12 ft.; 8 in. by 8 in. by 12 ft.; 2 in. by 8 in. by 14 ft.; 3 in. by 8 in. by 14 ft.; and 6¾ in. by 8 in. by 14 ft.

The quality of all of this material has been good because the greater part of the salvaged material was removed on account of mechanical wear or obsolescence of structures. The treatment which had been given most of the timber had penetrated through the sap portion of the wood but not that which contained a great amount of pitch. Even so, this latter portion, although untreated, is quite durable.

The benefits derived from the sawmill are so widespread that even our building janitor shares them. Since shortly after starting its operation, he has been using the sawdust in place of sweeping compound. He claims that the creosote remaining in it collects the dust particles to such an extent that it is as good or perhaps better than the special sweeping compound he had been using.

Rail-Car-Mounted Crawler Crane Speeds Track Construction

WHILE constructing a 28-mile section of railroad branch line in the Pacific Northwest, a contractor utilized a Northwest crawler crane, mounted on a specially-built, steel rail car, to speed up the work of laying the track. The car was propelled by a chain drive from the crane and was coupled to another car which carried a supply of rails.

In operation, the crane picked up rails from the rear car and swung around to lay them in place on the ties in advance of the unit. A rail-mounted air compressor, operating pneumatic spike drivers and track wrenches, followed behind the crane. With this equipment, a force of two foremen and 12 men was able to lay 3,300 ft. of rail in eight hours. Later, an enlarged force of 19 men laid 4,400 ft. of rail in eight hours. The car for mounting the crane was developed by the General Construction Company, Seattle, Wash.

ROCK ISLAND

Restores Pipe-Line Capacities With Acid Solvents

This article tells how the Chicago, Rock Island & Pacific has cleaned effectively a number of pipe lines serving water columns, employing the acid method, which, under modern practice, calls for the use of special equipment and several acid solvents, each solvent being selected to react on the particular form of incrustation found in the pipe line. The benefits derived are seen in the fact that in all cases the rate of delivery was restored to practically normal.

ALONG with a number of other roads, the Chicago, Rock Island & Pacific has experienced a high degree of success during the last few years in cleaning a number of badly incrusted pipe lines serving water columns, employing acids. In every case where this work has been done, the rate of delivery of water to locomotives has been materially increased, reducing the time required for taking water from one-quarter to one-half that required before cleaning. The water column pipe lines cleaned have ranged from 8 in. to 12 in. in diameter, and from 400 ft. to 1200 ft. in length, and in each case have been cleaned by either the Dowell system, employing specially designed mobile tanks and pumping equipment, or with company forces employing company-owned equipment, utilizing a range of acids to meet special conditions.

Among the pipe lines cleaned on the Rock Island by this method have been a 12-in. line 1,200 ft. long, serving four water columns at Rock Island, Ill., 800 ft. of 12-in. and 700 ft. of 8-in. pipe at Hutchinson, Kan., 800 ft. of 12-in. pipe at Chickasha, Okla., and 420 ft. of 12-in. pipe at McFarland, Kan. The work at these various points resulted in reducing the average time required to take 10,000 gal. of water from 10 min. before cleaning to approximately 4 min. after cleaning.

Improved Method

The methods used in acidizing these various lines have involved marked improvement over earlier methods of doing this class of work, and in the case of the Dowell method has speeded up operations materially. Most earlier methods were rather crude, and the results obtained were not always satisfactory. The solvent generally used was acid, sometimes incorporating an inhibitor to prevent damage to the pipe and fittings, but more often the acid was used alone.

Present practice utilizes many types of acid solvents, each of which is selected to react on the particular form of incrustation found in the pipe lines. Samples of the incrustation are collected and subjected to chemical analysis to determine the correct solvent required. Where the layers of scale are of different chemical composition, examination of scale samples is made to determine what substances must be dissolved. In this way, layers of scale of different chemical composition can be removed one at a time by applying selected solvents for each type of scale.

In the Dowell system employed on the Rock Island, after scale samples in the pipes to be cleaned had been examined and the character of the deposit had been determined, the required solvents and the necessary equipment for their application were brought to the locations of the pipe lines in five-ton tank trucks and tank trailers. These units included a two-stage air compressor, an acid circulating pump, a power winch, gages, hoses and fittings, and acid tanks with capacities up to 1,000 gal. On the usual cleaning job one or more trucks and trailers were used, one of which was located at each end of the section of pipe being cleaned.

Acid Tests Check Results

To prepare the length of pipe to be cleaned it was first drained. Then acid lines from the trucks and trailers were connected to each end of the section of pipe and, in some cases, the chemical solvents were circulated back and forth through the line by the pumps on the trucks. Solvent samples were taken at frequent intervals and tested

A Set-Up of Dowell Mobile Tanks and Pumping Equipment, Engaged in Cleaning a Railroad Pipe Line

to check the rate at which the solvent was being spent, thus determining when the scale had been completely removed. In other cases the solvent was pumped slowly through the pipe line, fresh solvent being fed into one end of the line as the spent solvent was wasted at the other. This continued until tests indicated that the line was clean, as determined by the strength of the solvent after it had passed through the line. After cleaning, the pipe was thoroughly flushed with water at high velocity to remove all traces of the acid, loosened sludge and broken scale.

Pumping Equipment of This Type, Mounted Behind the Cab of the Truck, Is Used in the Dowell Mobile System for Pumping the Solvent From the Tanks Into the Line Being Cleaned

Inhibited hydrochloric acid was generally used as the base solvent in the cleaning, but this generally included wetting and penetrating agents, together with foam control and silica removing agents, the specific formula used in any particular line or at any particular time being based upon the prior analyses of the incrusting solids.

Vents for Gas

The section of pipe to be cleaned was always completely isolated while the cleaning operation was being carried out. Vents were placed at high points in the line to permit the escape of gases formed as the incrustation was dissolved and to prevent gas locking or the pipe from becoming gas bound, and thus interfering with contact between the solvent and the incrustation being removed.

The time required to clean the various pipe lines on the Rock Island by the method described depended upon the size and length of the pipe and the character and amount of incrusting material in it. In one case, the time required to clean 420 ft. of 12-in. line carrying a 2½-in. carbonate deposit from a lime-soda ash treated water, was four hours. In most cases, to avoid interfering with normal operation as much as possible, the cleaning was done at times when train movements were lightest. In other cases, trains were required to take water at other points while the cleaning work was under way.

Company Equipment Method

In the company-handled pipe cleaning projects on the road, the procedure followed has been similar in many respects to that described, especially as regards the preliminary examination of the pipe incrustation and the type of acid best suited to the cleaning operations, but instead of using acid-carrying tank trucks and trailers, the railroad has used 500-gal. capacity tanks of its own, supplied from chemicals purchased in tank-car lots. As fed to the tanks the acid has been diluted to the proper strength and then pumped slowly into the section of line being cleaned by mechanically-driven rotary pumps, either wasting the acid as it lost its strength, or recirculating it until cleaning was complete, adding fresh acid as required—thus minimizing the amount of acid used on any particular job. As in the Dowell process, the lines have then been flushed thoroughly for the purpose of completely removing all acid, sludge and loosened scale before returning them to service.

Convenient Method

One of the features of the Dowell method, and its greatest advantage as employed on the Rock Island, has been the convenience and speed which this method affords in getting to and completing a job with its mobile tank equipment. For example, in the case of the water-column line-cleaning job at Rock Island, Ill., previously referred to, involving 1200 ft. of 12-in. line serving four water columns, the Dowell equipment was connected to the line at 8 a.m. and the line was cleaned and restored to service by 2 p.m. the same day. This rapid cleaning made it unnecessary for important steam passenger trains to make extra water stops elsewhere on the line. Using ordinary cleaning equipment, it is estimated that cleaning this line would have required from 8 to 10 hr., which would have necessitated extra water stops for these several important trains.

The work described has been done under the general direction of F. W. Thompson, chief engineer of the Rock Island, and under the immediate direction of J. E. Tiedt, engineer of water service and timber preservation, Chicago.

Welded Rails for Transfer-Table Pit

(Continued from page 578)

plished by laying the 800-ft. lengths first, and then running the table onto them. Finally, the balance of the old rail was removed and the shorter welded lengths were laid in place. The long and short lengths in each line of rails were then welded together in place by means of the Oxweld hand butt-weld method. The new rails rest on the same concrete foundations that supported the old rails, and are held in place by bolted clip assemblies.

Altogether, a total of 182 welds were made in producing the six continuous rails. Average production was about 16 finished welded joints per shift.

The work of installing the continuous rails at the transfer table was carried out under the general direction of A. A. Miller, chief engineer of maintenance of way and structures, St. Louis, Mo., and under the immediate supervision of G. L. Brown, division engineer, Kansas City, Mo.

Four Men Killed in Track Car—Train Collision

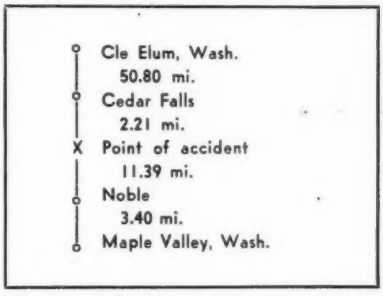
FOUR maintenance of way employees were killed and four other employees were injured recently, as the result of a head-end collision between an assembly of track motor cars and trailers and a freight train on the Chicago, Milwaukee, St. Paul & Pacific, near Cedar Falls, Wash. In its investigation of this accident, the Interstate Commerce Commission found that the failure of the railroad to provide adequate protection for the movement of the track motor cars was responsible, and in its report recommended that the railroad provide adequate block-signal or train-order protection for the movement of track cars on its line. An abstract of the commission's report follows.

Location of Accident

This accident occurred on that part of the Coast division of the Milwaukee extending between Cle Elum, Wash., and Maple Valley, 67.8 miles. At Cedar Falls, 51 miles west of Cle Elum, a siding parallels the north side of the main track and the west switch of this siding is 4,153 ft. west of the station at Cedar Falls. The accident occurred on the main track 1.42 miles west of the siding switch. From the east to the point of accident, there are, in succession, a tangent 990 ft. in length; a 3-deg. curve to the right, 862 ft.; a tangent 218 ft.; and a 4-deg. curve to the left, 996 ft. to the point of accident and 565 ft. beyond. From the west there is a tangent 1,046 ft. in length, followed by the curve on which the accident occurred. The grade in the vicinity of the point of accident is 0.64 per cent descending westward.

Instructions regarding the operation of track motor cars on this line include orders to the effect that employees operating track cars on main tracks shall, when practicable, obtain information in writing regarding the movement of trains, but that such information does not relieve them of the responsibility of protecting the cars, and they must see that the cars are in the clear for trains. Other instructions require that the person receiving the train information or line-up must repeat it to the one from whom it is received and must read it aloud to all persons riding the car. Also, these instructions require that heavily-loaded track cars, when used on the main track under circumstances in which it may be struck by a train, must be fully protected.

The assembly of maintenance-of-way equipment involved in this collision consisted of one track motor car, three trailers, one track motor car and five trailers, coupled and in the order named. The opposing train,



Showing the Relative Locations of the Point of Accident and Nearby Towns

Extra 1277 West, consisted of a steam engine, one car and a caboose.

On the day of the accident, a maintenance-of-way extra gang located at Noble, Wash., 13.6 miles west of Cedar Falls, was instructed to proceed by track car to a point about 30 miles east of Cedar Falls to perform track work. About 8 a.m. the train dispatched issued a telephone line-up to the general foreman of the extra gang regarding train movements in this territory. This line-up included the information that Extra 1277 West was expected to depart from Cedar Falls about 11 a.m.

Sent Flagman Ahead

About 8:45 a.m. the conductor of Extra 66 East, then at Noble, informed the general foreman that his train was authorized to proceed to Cedar Falls to meet Extra 1277 West at that point. Accordingly, the foreman instructed an assistant foreman to arrange for one of the members of the gang to proceed to Cedar Falls on this train and, upon arrival, to hold opposing trains east of the siding switch until the assembly of motor cars and trailers was in the clear on the siding.

Extra 66 East departed from Noble about 9 a.m. and the track-car movement, consisting of the two motor cars and eight trailers, occupied by a foreman, two assistant foremen and eleven laborers, left about five minutes later.

Extra 66 East and Extra 1277 West met at Cedar Falls about 10 a.m. and the westbound train resumed its operation immediately thereafter. A few minutes later, at a point about 2.2 miles west of the station at Cedar Falls, the collision occurred. It was raining at the time of the accident.

In the investigation it was brought out that the employee who was sent to hold westward trains at Cedar Falls until the arrival of the motor cars did not have a clear understanding of his duties. Instead, he said that he understood that, on arrival at Cedar Falls, he was to consult with another foreman for further instructions. For this reason, he took no action to hold Extra 1277 West. The engine crew of Extra 1277 West stated that the speed of this train approaching the point of the accident was about 25 m.p.h. and that they had no information of the movement of the motor cars until the fireman first saw the assembly of car and trailers about 20 ft. distant. He called a warning to the engineman, who immediately applied the brakes in emergency, but the collision occurred before the speed of the train was materially reduced.

The speed of the motor cars immediately prior to the accident was about 8 m.p.h. When the members of the extra gang first saw the opposing train it was a few hundred feet away. The brakes were applied and the motor cars and trailers came to a stop immediately prior to the collision. Because of an embankment, the view at the point of the accident is restricted to about 200 ft.

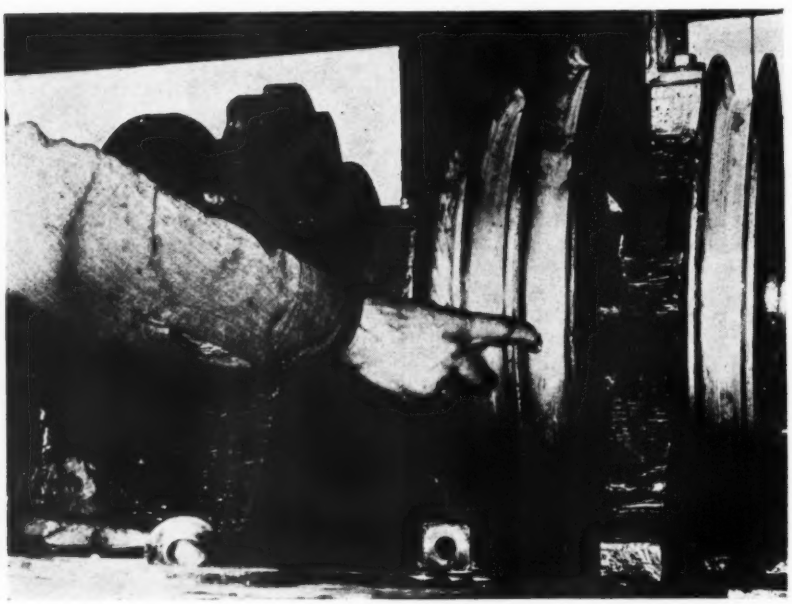
The commission found the cause of this accident to be the failure of the railroad to provide adequate protection for the movement of the track motor cars involved. It was pointed out that the members of the freight train crew were not informed by train order as to the location of the opposing track car movement and that these cars were not given flag protection. The report stated that adequate train-order protection of the motor car movement might have prevented the accident. Also, it continued, if proper block protection had been provided, neither the track motor car nor the opposing train would have been permitted to enter a block occupied by an opposing movement.

The report concluded with the recommendation that the Chicago, Milwaukee, St. Paul & Pacific provide adequate block-signal or train-order protection for the movement of track motor cars on its line.

Should You Use a Larger Wire Rope?

RECENTLY a representative of a large construction company expressed the belief that many manufacturers of heavy equipment of all types are not making sheave and drum grooves large enough. He illustrated what he had in mind by citing as an example two power shovels, both having 2½-yd. dippers, working side by side on the same job, handling the same material, and both operated by skilled shovel runners.

The only difference between the two outfits was that Shovel A was equipped with 1-in. wire rope, while Shovel B employed 1⅛-in. rope in re-grooved sheaves. As a further indication of the similarity of the equipment, the two ropes were identical in construction, each being 6 by 19, preformed regular lay, and each were of improved plow steel. The service record of one run showed that Shovel B, which was equipped with the 1⅛-in. wire rope, moved a total of 257,967 tons of material during the period, while during the same period Shovel A, which was equipped with the 1-in. wire rope, handled only 112,184 tons. As a result of this record the construction company is regrooving the sheaves and drums on all of its equipment, as it becomes necessary to dress them, to accommodate slightly larger ropes. In doing this, it is expected that the service obtained from the wire rope will be doubled at only a very slight increase in the cost for the rope.



These Sheaves for the Hoisting Line on a 2½-Yd. Shovel Were Regrooved for 1⅛-In. Diameter Rope Instead of the 1-In. Rope Originally Used

Not Practical in All Cases

Discussing the matter further, the representative of the construction company expressed some doubt whether such a policy can be applied to all cable-operated equipment. He suggested the probability, however, that machine designers are still building sheaves and drums suitable for the old, ordinary non-preformed wire rope; that they may be failing to take into consideration the extreme flexibility of preformed wire rope and its ability to withstand bending fatigue.

These characteristics make it possible to use a smaller diameter sheave or drum with the preformed rope.

The table used currently for minimum diameters for drums and sheaves for the several designs of wire rope is as shown. This table, which was compiled originally for ordinary, non-preformed wire rope, has been in use without change for many years. According to the representative who has been quoted, actually it is obsolete so far as preformed wire rope is concerned.

Table for Calculating Minimum Sheave and Drum Diameters

Form of Construction	Sheave or drum diameter, times the diameter of the rope
6 x 7	42
6 x 9 Seale	34
6 x 16 Filler wire	30
6 x 19 Warrington	30
Flattened strand	30
8 x 19 Seale	26
6 x 19 Filler wire	26
6 x 22 Filler wire	23
8 x 19 Warrington	21
8 x 19 Filler wire	21
6 x 37 Seale	18
6 x 41	18

In the case cited, the two ropes were 1 in. and 1⅛ in. in diameter. Since the rope construction was 6 x 19, this meant that if the machine designer were to follow the table literally, the sheave diameter for the 1-in. rope would be 30 in., while that for the 1⅛-in. rope should have been 34 in. Yet, it was pointed out, the 1⅛-in. rope, running through sheaves designed for 1-in. rope, gave twice as much service as the 1-in. rope running through sheaves designed for it. This was attributed solely to the fact that the rope was made more flexible by being preformed.

Design Sheaves for Preformed Rope

In conclusion, it was emphasized that it is reasonable to believe that, when endowed with flexibility, a larger diameter, and thus a stronger rope, will far outlast a smaller rope. Since, at present, more than half of all the wire rope made and used in the United States is preformed, what really needs to be done is for the wire-rope industry to formulate a new table for sheave and drum diameters, based on the greater flexibility of the preformed wire rope. In the meantime, it is suggested, that it may be worth while for many operators to consider re-grooving the sheaves and drums on their present equipment to accommodate a larger and stronger rope. Before doing so, however, one will be wise if he consults a wire-rope engineer.

Efficient Operation of Motor Cars

Part I

By G. R. WESTCOTT
Assistant Engineer
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No. 13 of a Series

This installment of the series on the selection, care and operation of track motor cars is the first section of a two-part article on how to insure the efficient operation of motor cars. In it the author gives particular attention to keeping the car in condition, racing the engine, applying the load, making adjustments, and care of the cooling system, winter and summer. Part II, to be published in a subsequent issue, will continue with a discussion of the cooling system, the use of anti-freezes, fuel and other factors, and will end with a list of 18 rules for the efficient operation of cars.

THE MODERN track motor car is not a complicated machine and its operation does not call for any unusual mechanical skill. At the same time, if a car is to render efficient service, it must be given the same intelligent care in operation that is necessary with any other piece of machinery. Motor cars are frequently subjected to abuses in service that not only reduce their efficiency but increase the expense for repairs and shorten their life as well.

A track motor car should have a life of 10 years or more, while the periods between shoppings should vary from two to four years, depending upon the service required of the car and the treatment given it. Instances are not at all uncommon where cars have been in use for five years without being shopped, and a number of cases have been reported where cars have been used for as long as nine or ten years without general repairs. The fact that these cars gave long years of uinterrupted service without extensive repairs was not a matter of chance. It was the result of careful operation.

Assuming the cost of a general overhauling to be 50 per cent of the cost of the car, the yearly cost of major repairs is 25 per cent of the new cost, on a basis of shopping at intervals of two years. If shopping is required only once in four years, the annual cost of major repairs drops to 12½ per cent, and on an eight-year basis, to 6¼ per cent. It cannot be expected that every car can be operated for 8 or 10 years, or even for 4 or 5 years, without general repairs, but that this is done in some cases, and the cost of major repairs thus reduced, indicates clearly the importance of care and intelligence in the operation of motor cars. It is true, of course, that the shopping cost is not by any means the entire cost of maintaining the car, but records of long service between shoppings are usually accompanied by records of light expense for running repairs and of freedom from service interruptions.

In a broad sense, efficient operation involves many things. If any one of them is neglected, the most careful attention to the others will not insure efficiency. One of these is the care the car receives in cleanliness. timely repairs, proper adjustment of its parts, and protection from the weather. Another, closely allied to the first, is the care and intelligence used in the handling of it on and off the track, in avoiding overloading and high speed, and in the control of it mechanically. Still another is in the selection of the car itself, of the parts required for its maintenance, and of the supplies furnished.

With respect to the care of a car in both maintenance and handling, efficient operation depends largely on the operator. If the responsibility for both is placed on him, efficient operation will be secured to the degree that he uses care and intelligence in the performance of his duties. The indiscriminate operation of the car by different men, without regard to the knowledge or ability of each, will inevitably result in inefficient operation; this is why the pooling of the cars is undesirable.

Such features as keeping the car clean, handling it carefully on and off the track, and the avoiding of high speed and overloading have been discussed in a previous article in this series, and are all essential to efficient operation. Effective maintenance of the car is also important. All machines require repairs at times. If the repair of one part is not made when needed, the failure of another part often follows, or the performance of car is often poor. Interruptions of service or poor performance mean inefficient operation, for if the gang or an individual workman is delayed because of the car's poor condition, the expense of that delay is rightly charged against the ineffiency of the car.

Racing the Engine

There are certain practices in the handling of the mechanical features of the car that must be known and observed by the operator if efficiency in operation is to be secured. One of these is to avoid racing the engine. In the case of a car with a free-running engine, the temptation is strong to race the engine when starting in order to speed the warming-up process. It should be remembered that in a cold engine the lubrication is poor and that serious wear may take place before the bearing surfaces are fully lubricated. Also, until normal lubrication is established, the parts do not move freely and heavy strain may occur. Even when the engine is warm, racing may cause excessive bearing pressures and parts may be fractured by the shock.

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A careful and intelligent operator will not apply the load until the engine is operating freely enough to handle it with reasonable ease. This means waiting, after starting, until the engine is warm. Four things should then be remembered:

(1) That the belt or clutch need be only tight enough to take the load; excessive belt tension, or a heavy pressure on a friction drive, creates an internal friction in the machinery that may absorb a considerable part of the power of the engine. Often where a belt tightening device or friction drive mechanism has a spring to regulate the pressure, a thoughtless operator will tighten the spring so that it no longer functions, and the full force exerted on the control lever is transmitted to the belt or drive. This has caused early failure of bearings, belts and friction drives.

(2) That the power application should be made carefully. When the engine is running, perhaps at considerable speed, and the car is standing, to let in the clutch or to tighten the belt suddenly throws a heavy strain on all parts of the machinery. On the other hand, unnecessary slipping of belt or clutch is to be avoided. A heavier pull on the control lever may be necessary to start a load. If that is the case, the pressure should be reduced as soon as the load is in motion.

(3) That if the transmission permits a choice of speeds, the load should be started in low and the change to higher speed made after the car is in motion, and then only if the power of the engine will permit without laboring.

(4) That if a manual spark control is provided, the spark should be retarded if the engine speed is reduced by a heavy load or a stiff grade; but that it should be fully advanced for normal running.

Making Adjustments

If a car is to operate efficiently, adjustments of parts must be made frequently. These adjustments are explained in the instruction books furnished by the manufacturer of the engine or car, and the operator should have a copy of such a book and become familiar with it. Some experience is necessary, however, in making the adjustments, and while the operator may recognize that they are needed, he should not attempt them unless he has had the necessary experience. Often it is better that he advise the maintainer that adjustments are necessary. Tinkering should be avoided; attempting an adjustment that he does not understand may be educational to the operator in some cases, but it does not make for efficient operation. Tinkering may make the condition worse, even to the point of causing a complete service failure.

For efficient operation the temperature of a gasoline engine must be neither too cold nor too hot. If it is too cold, the fuel will not vaporize and ignite freely; if it is too hot, the oil may burn and lubrication fail, or the piston may expand to the extent that it may bind or "freeze" in the cylinder, stopping the engine. Since the temperature of combustion in even a low-compression engine is about 1,800 deg. F., an engine, under most operating conditions, will warm up to a suitable operating temperature quickly after starting and, thereafter, some means of dissipating the heat or cooling the engine must be found. Proper cooling is of the greatest importance to efficient engine operation. The equipment used for cooling has been described in a previous article in this series; the discussion that follows is designed to point out some of the ways in which the cooling system may be made to function efficiently.

Heavily Loaded Cars Must be Started with Care to Avoid Damaging the Transmission

In the simplest form of air cooling, the excess heat is absorbed by air circulating about cooling fins provided on the cylinder and cylinder head. Only one simple precaution is necessary in this case, and that is that nothing shall be allowed to interfere with this free circulation of air. Where forced air circulation is used, it is necessary that the equipment provided for that purpose be maintained in good working order.

Hopper and Condenser Cooling

The requirements for water cooling are equally simple, although somewhat more troublesome to carry out. For hopper-equipped engines, with or without condensers, the requirement usually is simply that the hopper be kept clean and filled to the proper height with clean water. In some cases, however, the water available is very corrosive, and the life of the hopper may be short unless a rust inhibitor is used. Such materials are available, but their use is difficult to supervise and they should be used only where non-corrosive water is not available. Often, because of the inconvenience, their use is omitted and engine maintenance is increased by the frequent need of renewing the hopper.

Radiator Cooling

With radiator-cooled engines, there is the same need for keeping the cooling system clean and filled with clean soft water. In addition, attention must be given to the fan providing circulation of air through the radiator. The fan belt should be kept at sufficient tension to insure continuous operation of the fan. Greater tension than that is not required, and besides absorbing power, may cause early failure of the fan bearings and belt. Less tension is necessary with a V-belt than with a flat belt. The condition of the fan belt is readily determined by inspection, and should be observed frequently. A new belt should be secured when it appears that the old one is likely to fail. It is easy to overlook the lubrication of the fan. On some motor car engines, no convenient provision for lubrication is made and fan failures from lack of lubrication are not uncommon.

The circulation of the water from the engine to the radiator may be by thermal action only, or by means of a water pump. If a pump is used, a suitable grease must be provided for its lubrication. Any grease that will disintegrate when in contact with hot water is unsuitable for two reasons: (1) such a grease will be washed away by the cooling water, leaving the bearings without lubrication, and (2) the grease picked up by the coolant may interfere with the cooling, particularly by clogging the small passages in the radiator.

The pump packing must be watched carefully and the packing

nut tightened or the packing renewed as required. The packing nut should be drawn down only tight enough to prevent leakage; tightening too much causes unnecessary friction and often results in scoring the pump shaft. If this occurs, the shaft must be renewed to avoid leakage.

Hose connections between radiator and engine block must be watched to see that the hose is sound and that the hose clamps are tight. When a section of hose shows signs of softening, it should be replaced promptly. The bursting of a hose connection means at least an interruption of service until a new hose is secured, and serious damage to the engine through overheating may result.

Cooling in Winter

Freezing temperatures introduce new problems in engine cooling. With an air-cooled engine, it is necessary only to protect the engine from the full effects of the cold air to the extent necessary to maintain a suitable operating temperature. This can be done by shielding the engine from the direct blast of air.

The water hoppers on modern engines using that type of cooling are so designed that no damage by freezing will result if two simple precautions are observed: (1) That the hopper is not filled above a designated point, and (2) that, after freezing, the ice in the hopper is completely melted before being permitted to freeze again. When a condenser is used in connection with hopper cooling, it may be necessary to protect it from excessively cold air to prevent damage due to the freezing of the water condensed in it.

Great damage may be done a radiator-cooled engine by the freezing of the cooling water. Even though the water jacket on the engine is provided with expansion plugs, a severe freeze may crack the engine block, and a light freeze may burst the thin walls of the radiator core and cause leaking. Any radiator-cooled engine may be protected against damage by freezing by regulating the circulation of air through the radiator when the engine is running, and by draining the cooling system when the engine is idle. If the cooling system is drained when the engine stops, and is refilled with warm water at the time of starting, as is often done with hopper-cooled engines, the starting will be much easier. This is often inconvenient if the capacity of the cooling system is large, and especially if the car is used intermittently. In such cases, an anti-freeze added to the cooling water may be used to lower the temperature at which the coolant will freeze. A good anti-freeze must not clog any part of the cooling system as, for example, the small channels in the radiator core. Also, it must not attack the materials of which the radiator core, the hose connections, or the water jacket of the engine itself, are made. These considerations rule out the use of kerosene, or inorganic salts, such as common salt or calcium chloride.

Impermanent Anti-Freeze

The two groups of anti-freeze materials in most common use are (1) the impermanent materials which boil away and must be replaced, and (2) the permanent or evaporation-resisting materials. Denatured alcohol, which is ethyl or grain alcohol with a denaturant added to make it unfit for beverage purposes, is the best known of the impermanent group. When prepared expressly for use as an anti-freeze and sold under a trade name, this often contains a rust inhibitor and may be treated to delay evaporation. It is effective as an anti-freeze, providing always that the coolant contains a sufficient percentage of it. Its effectiveness depends on the concentration and character of alcohol; methyl or wood alcohol is somewhat more effective than denatured alcohol. The proportions used, therefore, should conform to the instructions of the manufacturer. This condition is easily met when the anti-freeze is first added, but is difficult to maintain thereafter because the alcohol in the mixture evaporates more rapidly than the water at all temperatures, and often boils away at ordinary operating temperatures when water does not.

If an engine is used intermittently, the rise in temperature or "after-boil" at stopping is often 20 deg. F. or more. The boiling point of a half and half mixture of alcohol and water is about 180 deg. If a thermostat is used to assist in warming up the engine quickly, it should obviously be calibrated to open at less than 160 deg. F. or there will be much loss of anti-freeze due to after-boil.

It should also be noted that any anti-freeze having a boiling point less than that of water is unsuitable for use in two-cycle engines because of the high temperature at which these engines operate. Generally, water only is used in such engines; but if an anti-freeze is used, it should be of the permanent type.

Hydrometers are widely used to determine the freezing point of the coolant. Such determinations, however, are not accurate since the specific gravity of the mixture, which is the basis of the hydrometer reading, varies both with the character of the anti-freeze and with the temperature of the coolant at the time the reading is taken. To give a reasonably dependable reading, therefore, it is necessary (a) that the hydrometer be calibrated for the particular character of anti-freeze used, and (b) that the reading be taken when the temperature of the coolant is that for which the hydrometer was calibrated. Even if the temperature of the coolant is noted and a correction made from tabulated values, the freezing point so determined may be quite different from the actual.

The variation of hydrometer reading from the actual freezing point of the coolant does not involve as much hazard of damage as might be supposed. Any mixture of two liquids having two different freezing points will not form a solid ice until both are congealed. The water freezes first into particles of ice suspended in the slower freezing alcohol. This mixture of ice and liquid is sufficiently fluid that it will often adjust itself to the available space without exerting sufficient force to cause damage. The mushy mixture, however, may be sufficiently thick to clog the small channels in the radiator and prevent the circulation of the coolant, thus causing the engine to overheat and the coolant to boil away.

As a guide in the use of alcohol where the manufacturer's instructions are not available, the quantities of alcohol required to lower the freezing point of the coolant to various required temperatures are given in the accompanying table. Because of the uncertainties of the character and concentration of the anti-freeze material, the values given are fairly liberal.

Quantities of Alcohol Required as Anti-Freeze

Temperature in Degrees F.	Alcohol in Mixture		Water in Mixture	
	Per Cent	Pints Per Gal.	Per Cent	Pints Per Gal.
+20	20	1½	80	6½
+10	30	2½	70	5½
0	40	3¼	60	4¾
—10	45	3½	55	4½
—20	50	4	50	4
—30	60	5	40	3

What's the ANSWER?

Keeping the Right of Way Clean

What benefits accrue from keeping the right of way clean and neat by brush cutting, mowing, etc.? How much time are the track forces warranted in spending for this purpose? How can the time and cost involved in this work be held to a minimum?

Machines Produce Benefits

By F. S. Schwinn
Assistant Chief Engineer, Missouri Pacific Lines, Houston, Tex.

Cleanliness and neatness have always been closely associated with railway maintenance. They are as applicable to the right of way as to the shop and station grounds. Both tangible and intangible benefits may be obtained through keeping the right of way clean and neat by means of several available methods, such as cutting, mowing, or burning brush and weeds, or combinations of these methods. Cleanliness and neatness appeal to the traveling public, and also have a highly desirable effect on employee's morale.

The removal of brush and weeds destroys hiding places for scrap, permitting its orderly collection and salvage, a valuable consideration at present prices. It also eliminates the hazards of employees stumbling over hidden materials and resultant personal injuries. In some localities the clearing of brush and weeds is found desirable in order to permit more rapid drying of roadbed and embankment. Of necessity, brush and weeds must be removed from ditches to provide for the needed drainage.

Track forces are not warranted in spending very much time in the cleaning of right of way. The cost of track labor has risen to the point where it should be concentrated on the track to the greatest extent possible. The cleaning can not be performed satisfactorily by hand because it is too slow and costly. If it is to be done at all it must be done at the lowest cost possible, as the effects of such work do not directly involve the economical and satisfactory operation of trains.

In order, therefore, that the cost may be held to a minimum, it is not only desirable but necessary that cleaning of the right of way be performed by machine. For this purpose, a number of off-track machines have been developed which will perform a very satisfactory and economical job. In the case of burning, the forces employed must be supplemented by additional labor for the purpose of controlling the fire and holding it within safe limits. While the ordinary tractor-mounted mowing machines can cope with weeds and most of the brush, occasionally it will be found that heavier brush or even trees should be removed. Tractor-mounted, power-operated saws are available for this purpose.

Where the terrain is rough, the operation of tractors is frequently difficult and slow, and in some cases even impossible. Therefore, it is highly desirable that the right of way be smooth, and kept as nearly so as practical. Much improvement of this nature can be made from time to time in connection with the restoration of embankments and the cleaning of cuts where this work involves the operation of bulldozers, scrapers and graders.

Generally speaking, the right of way should be kept both clean and neat, but this should be recognized as a secondary rather than a primary maintenance necessity. It is important that such work be carried on without interfering with or curtailing more important maintenance operations. Much

Send your answers to any of the questions to the What's the Answer Editor. He will welcome also any questions you wish to have discussed.

To Be Answered In August

1. *What are the disadvantages of undrained borrow pits or side ditches? Does it make any difference whether the saturation of the roadbed is uniform and permanent or not? Does the character of the material in the roadbed make any difference?*

2. *What special preparation, if any, is necessary before painting concrete surfaces, such as floors, walls, columns, etc.? Does it make any difference whether the concrete has been surface-hardened? If so, what?*

3. *Where new rail is laid of the same length as that in track, should the locations of the new joints be permitted to coincide with those of the former joints or should they be changed? Why?*

4. *What type of culvert should be used where it must carry acid refuse water from industries? How can existing concrete culverts be repaired effectively if damaged by such water?*

5. *What is the best method of calling a man's attention to the fact that he has violated a safety rule? Are disciplinary measures effective? If so, how can they best be administered?*

6. *Where quick-acting valves are necessary at Diesel watering points, how can the damaging effect of water hammer be best overcome?*

7. *What is the maximum length desirable for manganese, one-piece guard rails? Why? What is the maximum practicable length? Why?*

8. *How serious is the deterioration of asphalt paving at freighthouses, passenger stations, and other buildings, due to drippings of oil and gasoline from automotive equipment? How can this deterioration be prevented?*

can be accomplished in this direction by careful planning and programming. This planning should take into consideration the nature of the growth, and which will produce the greater benefits—cutting or burning.

Eliminates Fire Hazards

By J. R. Derrick
Manager Roadway Maintenance, Norfolk & Western, Roanoke, Va.

There are many benefits to be realized from keeping the right of way clean by brush cutting, mowing, etc. Fire hazards to forests and bridges are minimized, the wire lines are kept clear and the right of way is made to look as if a neat housekeeper were on the job.

The most economical way to keep the right of way clean is to cut grass and weeds out to the shoulders of fills and the bottoms of cut slopes the latter part of June, providing the vegetation is sufficiently advanced. Then in winter, when the weather is such that section forces cannot do other work to advantage, they should cut the brush, etc., out to the right-of-way line and burn the entire right of way. In this work there should be cooperation with the state foresters and the National Fire Protection Association.

The time that will be spent by the track forces on this work will depend entirely upon the condition of the right of way and the topography of the ground. A lot of right of way can be economically cut by on-track mowing machines, some by off-track machines, and quite a lot by teams and farm mowers. By thus engineering the work, the time and cost involved are reduced to a minimum.

Clean Property Aids Morale

By Engineer Maintenance of Way

Our experience over a period of years has proved that many benefits are derived from keeping the right of way free of vegetation by annual mowing and brush-cutting operations. Such a program lessens the succeeding growth of vegetation, resulting in an easier task each year. If the right of way is free of vegetation the fire hazard to railroad property, as well as that of adjoining property is reduced to a minimum and the amount of moisture to be drawn into the adjacent subgrade is lessened, resulting in better and more economically maintained track. A clean right of way affords track men sufficient room to stand back a safe distance from passing trains, especially when the shoulder is narrow, and allows trainmen and trackmen a better view, particularly around curves; thereby aiding in preventing motor car accidents and collisions at highway crossings. Live stock will not reach over the right of way fence to graze; hence there is less damage to fences.

There is also a psychological effect in keeping a clean right of way. The morale of the men in the field is much higher and more pride is taken by them in performing their work, resulting in better maintenance of track and buildings. The clean appearance of the right of way also tends to bring about a more friendly relationship between the railroad and owners of adjoining property.

Since the development of power-mowing machines the mowing of right of way has become an easier and less expensive operation. One power mower, double shifted, can mow about a mile of right of way of average width a day. This operation requires one mower operator, and three laborers with scythes to cut vegetation where the mowing machine cannot be operated. In addition to the economy resulting from the use of power mowers, the work is accomplished when the results are most effective, since such mowing is usually done in July and August.

After the right of way has been mowed, the ground should be promptly and thoroughly burned over. This practice not only tends to kill the roots of the vegetation but also destroys the seeds which might otherwise develop into plant life the following year. Vegetation can be effectively removed from track shoulders by using a spring-tooth harrow, pulled by a tractor. This kills the weeds along the shoulder and aids in proper drainage along the track.

Diesels' Effect on Bridges

What effect does the use of Diesel locomotives have on the stresses in bridges and trestles? How does this affect the maintenance and repair of existing structures?

Diesels Reduce Stresses

By G. M. Magee and E. J. Ruble
Research Engineer and Structural Engineer, Respectively, Association of American Railroads, Chicago

The effect of Diesel locomotives on the stresses in bridges and trestles can best be explained by comparing the stresses produced by Diesel locomotives with those produced by steam power. The stresses produced by a locomotive standing or moving very slowly (5 m.p.h.) across a bridge are referred to as static stresses. These are only about 60 per cent as much for Diesel as for modern steam locomotives. Such low static stresses under the Diesels are due to their lighter axle loads and the wider spacing of the axles. However, Diesel locomotives are now being planned having heavier axle loads and a smaller spacing of the axles, so that it is quite possible that future power of this type may produce static stresses that will approach those produced by steam locomotives.

At higher speeds, the stresses increase, and this increase in stress as compared to the static stress is called the impact effect. This effect can only be determined with the aid of very sensitive measuring instruments. During the past six years the Association of American Railroads has conducted extensive strain-gage readings on beam and girder spans under both steam and Diesel locomotives operating at speeds varying from 5 m.p.h. up to 85 m.p.h. for the steam locomotives and 100 m.p.h. for the Diesels.

In the analysis of our impact test data, we have found that the total impact can be divided into the rolling effect and the direct vertical effect. The rolling effect is due to the rolling of the locomotive from side to side, while the vertical effect is due to the condition of the track, wheels, rail joints and the periodic disturbing force of the unbalance in the drivers. The main cause of the vertical-effect impact under steam locomotives is due to the unbalance in the drivers that occurs at high speeds, while the principal vertical-effect impacts under the Diesels result from badly battered rail joints or flat spots on the wheels, and occurs at 20 to 30 m.p.h. With the track in normal condition, the recorded impacts under the Diesels are only about one-half those recorded under the steam locomotives. With a badly-battered rail joint at the center of a short span bridge, the impact percentages under the Diesels are about the same as those recorded under the steam locomotives; however, even with this condition, the maximum static stresses plus the impact stresses recorded under the Diesels were only about 60 per cent of those recorded under the steam locomotives.

In general, the recorded rolling effect impacts have been smaller for

Diesel locomotives than for steam locomotives. Any reduction in the rolling effect reduces the variation in deflection between the two girders with a corresponding decrease in the stresses in the cross-frame bracing.

The Committee on Iron and Steel Structures of the A.R.E.A. recognizes that the impact in steel structures is less under Diesel locomotives than under steam locomotives. Impact varies with the length of the span, but, taking a 100-ft. girder span on 10-ft. centers as an illustration, the committee proposes for new structures, an impact allowance of 35 per cent for Diesels and 50 per cent for steam locomotives.

Diesels Have E-40 Rating

By A. R. Harris
Assistant Engineer of Bridges, Chicago & North Western, Chicago

Diesel locomotives now in operation have a maximum load rating on bridges and trestles about equivalent to Cooper's E-40. This is scarcely more than the load rating of the light types of steam locomotives used on branch lines. Tests seem to show that the impact under Diesel locomotives is about the same as for steam locomotives, notwithstanding the fact that the Diesels do not produce a hammer-blow effect like that of steam locomotives operated at high speed. However, that part of the impact attributable to low rail-joints and other track irregularities is probably more for Diesels than for steam locomotives because of the relatively small diameter of their wheels—36 in. to 42 in.

In so far as strength of bridges is concerned, it may be concluded that Diesel locomotives have the same effect on stresses as do steam locomotives of comparable rating, ranging up to Cooper's E-40. However, the effect of the high local concentrations on rail stresses should be kept in mind and investigated before Diesel locomotives are permitted to operate over light rail. These concentrations range up to 65,000 lb. per axle.

In regard to the matter of maintenance and repair of existing bridges, it is my belief that no data are yet available upon which to base an opinion.

Lighting in Waiting Rooms

When modernizing stations, what type of lighting fixtures should be used in waiting rooms? Does the size of the room make any difference? What intensity of illumination should be provided?

Fluorescent Lamps Best

By M. A. Mortensen
Engineering Division, General Electric Company, Cleveland, Ohio

Good lighting in the railroad field is as much a merchandising medium as it is in any other field that has something to sell. A well-lighted waiting room immediately shows the traveler that the railroad is interested in his comfort and well being. While waiting for trains, the majority of travelers read, at least to some extent. Proper lighting, in addition to helping pass the time by making it easier for them to read, is a tool which greatly facilitates the transformation of a dim, gloomy waiting room into one with a pleasant, cheerful atmosphere.

The relighting of a waiting room in most cases means the use of the most modern light source, the fluorescent lamp, which is now available in a variety of colors, in wattages from 6 to 100 and in lengths from 9 in. to 8 ft. With its high luminous efficiency, low heat radiation, low brightness and extended length, it is a "natural" for use in any modernization program.

The recommended level of illumination for waiting rooms is 20 foot-candles maintained in service. This would be higher if people were accustomed to settle down and read for hour after hour, but for the casual sort of reading that is done in a waiting room, 20 foot-candles will be found acceptable. With fluorescent lamps, 20 foot-candles can usually be obtained with about the same power load that would give only 7 or 8 foot-candles with filament-type lamps.

The size of the area has an effect on the type of lighting system to be used. This is influenced by the proportion of wall area to floor area, which greatly affects the actual utilization of light. For instance, in a large vaulted-ceiling type of waiting room it will not be economical to provide 20 foot-candles of general illumination due to the relatively poor utilization of light in this type of room. In this case, the lighting might better be accomplished by providing 5-10 foot-candles of general lighting and 10-15 foot-candles of supplementary lighting at the benches. The former can be done by well-controlled filament-type downlights located in the ceiling. The latter can be done by locating a continuous row of fluorescent lamps in properly-designed (with respect to reflector, lamp shielding and appearance) fixtures over the backs of the benches. Such an installation will provide illumination for the seats on each side of the benches.

The appearance of such an area can further be improved by finishing the ceiling in white and directing some light to the ceiling to relieve its darkness. This light can come from projectors using filament lamps in a cove around the room, located one-quarter or one-third of the way up the side walls, or from projectors located in torchieres on the floor, perhaps at the ends of some of the rows of benches.

In the smaller type of station it is usually more practical to light the area uniformly from a general lighting system. One type of installation which fits exceptionally well in a modern interior is the so-called troffer system. This consists of continuous rows of fluorescent lamps recessed into the ceiling. For use where conditions prevent recessing of the units, a ceiling-mounted type is available. The troffers should be so designed, with louvering arrangements or with etched or configurated glass panels, to shield the lamps from direct view. For most railway station applications the vertical type louver is recommended because this type does not collect dirt and dust as rapidly as the glazed type.

There is no reason why a suspended luminaire of the direct-indirect type should not be used in the waiting room of a station. This type of luminaire allows some light to go to the ceiling and then be reflected down to where it is useful, as well as letting some light go directly from the luminaires toward the floor. For railway station use, where the maintenance of the lighting equipment is definitely a problem, it is recommended that the major portion of the light be sent directly toward the floor, with only enough upward component from the luminaire to brighten up the ceiling so that it does not have a gloomy appearance. One of the main considerations in the selection of the particular luminaire, after the general type has been decided on, is that proper shielding of the lamp is provided so that the luminaire is not too bright and does not act as a source of uncomfortable glare.

A portion of the modernization program which is closely allied to the lighting includes the wall and ceiling finishes. It is important that these surfaces be finished in light tones to gain the best utilization of light, and to create a cheerful, friendly atmosphere. To help further in this matter, it is recommended that the daylight fluorescent lamp should not be used for this application but rather the

4500-deg. or 3500-deg. white fluorescent lamp. The daylight lamp tends to create too cool an atmosphere for waiting room use.

Need 20 Foot-Candles

By A. T. Hawk
Architect (Retired), Chicago, Rock Island & Pacific, Chicago

It is assumed in this discussion that the station is one that is being modernized to improve its appearance, and not one that has been heavily repaired and reconditioned. In general, fluorescent lighting is used, as this type provides: (1) Wide and uniform distribution of light; (2) better decorative effect; and (3) reduced cost of lighting due to less current used.

The size and shape of the waiting room has no influence on the use of fluorescent lighting, as this system is very flexible, and can be employed in many different forms and arrangements to satisfy almost any distinctive type of decorative effect. It can be combined with incandescent lighting, as was done successfully in the main waiting room of the Union Station at Minneapolis. It can be used in continuous strings, or conventionally spaced to provide the uniform intensity of light desired.

Fluorescent lamps are furnished in a considerable number of lengths and diameters, and in wattages ranging approximately from 6 to 110. Circular lamps are also available in a few sizes. Fluorescent lamps come in different colors, with white being the one most frequently used in station service because of its warmer effect.

Light fixtures can be either suspended from or recessed in the ceilings, and are now supplied in many attractive patterns. They are generally made of heavy enameled steel, and the more recent patterns are enclosed with a light diffusing grille to improve their appearance, and to eliminate the direct view of the lamp. Recessed lights may be covered with ornamental glass. All fixtures should be designed with rigid supports, and for quick, economical cleaning and servicing.

The intensity of illumination that should be provided for the waiting room of a modernized station, depending somewhat on its importance, should be as close as possible to 20 foot-candles. The intensity-maintenance factor of fluorescent lamps is approximately 70 per cent, and the surrounding light absorption of ceilings, walls, floors, etc., 45 per cent. To reduce light absorption as much as possible, the finishes should be light in color, have a good reflection factor, and yet be soft and pleasing to the eye.

Room sizes affect the utilization of light. Large rooms use light more efficiently than small rooms, since there is less wall area per fixture to absorb this light. Mounted height in direct lighting, and ceiling heights in indirect lighting, in a given size room, also affect the light utilization. The higher the fixtures are suspended the more wall area is exposed to the light, and hence the greater the absorption. The lighting system should be figured on full illumination, with suitable control switches, so that as many lights may be turned on or off in series as desired.

Normal lamp efficiency decreases through use, and the collection of dust films on lighting equipment also reduces the desired intensity of illumination. If cleaning and lamp renewal are neglected the efficiency of the system may drop to less than one-half the designed value; therefore, light fixtures and lamps should be dusted at least once a month, and thoroughly washed with soap and water not less than four times a year.

Fire-Retardant Stock-Pen Lumber

What are the advantages or disadvantages of using fire-retardant and decay-resistant lumber for the construction of stock pens? Why? Are certain treatments preferable?

Creosote May Burn Animals

By W. J. Burton
Assistant to Chief Engineer, Missouri Pacific, St. Louis, Mo.

The conditions at stock pens are usually such as to promote decay, and the use of treated timber is therefore particularly desirable. Stock pens are also often located where grass fires may be expected; hence, resistance to fire is likewise desirable. However, timber which has been well treated is not easily ignited by grass fires, so that the fire hazard is reasonably cared for if decay resistance is provided.

The idea prevails that creosote may cause burns to animals coming in contact with it, and that sheep wool can be stained by it. While these fears may be unwarranted, they might form the basis for claims for damage to animals. For this reason, it is the usual practice not to treat stock-fence boards with creosote, but rather to use one of the salt treatments, such as chromated zinc chloride. The posts, however, may be so placed that it is impossible for an animal to come in contact with their surfaces, and therefore are preferably treated with creosote rather than with a salt.

In most cases, present-day treatment of railroad timber is by mixtures, such as creosote-petroleum residue, or creosote-coal tar. These mixtures have a tendency to form coatings on the timber. Such coatings are desirable in the case of crossties or most timber, but they would be undesirable on stock-pen boards. It would be inconvenient to treat stock-pen material separately with straight creosote instead of with the mixtures on hand. A light treatment of straight creosote, which would leave the boards dry, might be preferable to the salt treatment and just as satisfactory as far as any real harm from animal contact is concerned. However, stock shippers might not think it harmless, and this possibility must govern.

All Pens Now Creosoted

By Treatment Engineer

Posts and lumber used in the construction of stock pens should be pressure treated with an established preservative, since a longer and a more economical service life is thereby obtained. Where climatic and local conditions make decay excessive, creosote or creosote mixtures should be used, but where the fire hazard is first in importance the fire-retardant zinc treatments should be used. Quite often a combination of the two treatments can be used to advantage.

Our experience over a number of years with creosoted material has been quite satisfactory, and our stock pens are now 100 per cent creosoted.

Advantages Are Numerous

By H. M. Church
General Supervisor Bridges and Buildings, Chesapeake & Ohio, Richmond, Va.

The advantages of fire-retardant and decay-resistant lumber for the construction and maintenance of stock pens are numerous. Fungus and other organisms which result in rapid decay of timber multiply quickly in locations where cattle and other stock are stabled. In addition, termites thrive in these places, and cause excessive damage to timber.

Dry vegetation is kept in pens for feeding and bedding down the stock. This creates a fire hazard, and the use

of fire-retardant timbers would no doubt provide a valuable safeguard. Any of the recognized preservative salts would be satisfactory for this use, if the amount of retention is sufficiently heavy to provide both effective fire retardance and resistance to decay.

Training Trackmen as Foremen

*What methods or practices can best be employed to train capable young trackmen to assume future responsibilities as foremen?**

Suggests Two-Year Program

By J. C. Rouse
Extra Gang Foreman, Southern Pacific, Suisun, Cal.

After a young man has been selected to receive training as a foreman, he should be placed on a regular section under the supervision of a competent and reliable foreman. The student should receive a copy of all instructions issued by the roadmaster's office, and have a Book of Rules which he can keep up to date. He should be permitted to assist in preparing all reports made by his foreman. Considering the number of years a man will be a foreman, the responsibility he accepts, and the initiative and ability the management expects him to exercise, plenty of care and thought should be given to the training plan.

When many of us were promoted to foremen, we were surprised at the amount of information and instruction contained in the Book of Rules. To help the student in benefiting by the wealth of this information, it should be divided into phases corresponding with periods in his training. As he studies each phase, he should be required to pass both a written and an oral examination on its contents. The knowledge thus obtained will make the future foreman better able to do a good job.

The student should take part in all work performed by the gang, learn the correct use of each tool, the multitude of jobs a section gang is required to do, and the rules and instructions governing the reason each job is done a certain way. New men usually have a tendency to look upon the motor car as something for amusement and not for the purpose for which it was provided. The foreman should impress on the student's mind the importance of using the motor car properly and the seriousness of accidents and injuries which can result from operating it unsafely.

After the student has completed a period of four to six months on a section, he should be transferred to a large yard. There he can learn the importance of methods and timing in getting work done without interrupting switching service. There, too, he learns how essential it is to cooperate with yard officers and others. A part of this training period should be devoted to instruction in safety and the way to guard against conditions which are unsafe for men in the gang and others employed in the yard.

After six months in a yard, the student should be transferred to an extra gang doing ballast work, or surfacing behind a rail gang. This type of work acquaints him with methods of handling larger gangs under varying conditions.

A half year of such study should make him ready for his final training period in a rail-laying gang. The actual work of laying steel, installing switches and crossovers, cutting rail, and using the many kinds of equipment available on a rail job affords the student a great deal of experience. Under a good foreman much could be done to bring out the best in any promising young man. By the end of this training period, the student should have a broad knowledge, not only of track work and track materials, but also of the duties and responsibilities of a foreman. If so, he is ready for assignment as an assistant or relief foreman.

This program could be more effective if it included work on as many roadmasters' districts as possible, for each roadmaster could, no doubt, offer valuable constructive criticism on any weak spots in the student's training.

Planned Training Needed

By Geo. M. Strawhun
Track Supervisor, Missouri Pacific, Eads, Colo.

The problem of training foremen has not been approached on some railroads in a degree commensurate with its importance, which is becoming increasingly greater along with the refinements in our track structure that have been made necessary by the trends toward high speed, etc.

Our future track foremen should be trained men, schooled at the start of their foremanship. Railroads have employed the apprentice principle in schooling men for the skilled trades and crafts in the mechanical department with excellent results, and I can see no reason why it cannot be used successfully in the maintenance of way department where the need for such a program is equally important.

Because of the varying physical characteristics of different portions of the railroad, apprenticeships should be established on each division. Individual divisions would have to study their own particular needs carefully so that future foremen would be trained to serve successfully on the seniority district. Some divisions would need main-line foremen, some would need branch-line foremen and others would need both.

The length of the apprenticeships should not be less than 18 months, and the selection of the men to serve them should be made only after careful examination of their qualifications by both the roadmaster and division engineer. This matter should receive their personal attention in view of the fact that the men selected will be handling other men and materials for an average of 25 to 30 years for the railroad. With the high costs of both labor and materials, which are not only prevalent now but possibly will be for some time in the future, inexperienced and poorly-trained foremen are expensive luxuries that railroads simply cannot afford.

In addition to receiving daily guidance in the actual performance of work as he progresses, the apprentice foreman should receive correspondence courses in safety, the rules, special instructions, and standard plans of trackwork. Apprentices should receive lessons once a week, and be given written examinations, to be turned in for grading purposes. When the individual has completed his 18 months course, he should be given a general examination on what he has learned, and should be required to receive a passing grade in order to qualify as a foreman.

Because of pension age limits divisional demands for foremen can now be studied on a longer-range basis than has been possible in the past. Such known demands will assist officers in determining the quotas of apprenticeships necessary to fill the needs of the service.

This method of training would have to be worked out carefully, but I believe it would produce results in furnishing highly trained foremen, schooled in the requirements of modern railroading. The demands for higher speeds and smoother riding

* Additional material has been received on this subject but because of its scope it is being withheld for publication in a subsequent issue.

track necessary to cope with other forms of transportation, will require that foremen be highly trained in track work, and be resourceful, energetic, and have the initiative and leadership so necessary to get jobs done safely, economically and with minimum interruption to traffic.

Plowing Fire Guards

What methods are most effective and economical for plowing fire guards? What are their relative advantages?

Uses Bulldozer and Discer

By Division Engineer

Our railroad traverses a territory of which the unpopulated areas are covered to a large extent by scrub oak and pine. During the dry seasons, this area becomes highly inflammable, and the incidence of forest fires from all sources is relatively high. At these times the situation is further complicated by the fact that winds are not only almost continuous, but also vary in direction. Hence fire guards that must be confined to any right of way of normal width would be ineffective. However, in at least one state the law relating to the control of forest fires is so written as to permit steam railroads to enter onto the property of others for the purpose of plowing the fire guards.

Up until a few years ago, this chore was always performed by teams of horses pulling plows. This method was slow and rough on man and beast. In recent years, however, this work has been done successfully under contract by bulldozers, pulling tandem discers. The bulldozers are used instead of ordinary crawler tractors so that fallen trees can be pushed aside or undergrowth uprooted.

This method has proved both effective and economical. Since this work must be performed annually within narrow limits of time, concurrently over our whole territory, it is best done under contract. To do otherwise would require too large an expenditure for equipment, much of which would have little utility in other work.

Uses Special Heavy Discer

By S. H. Knight

Supervisor of Work Equipment, Northern Pacific, St. Paul, Minn.

Fire guards are necessary on the Northern Pacific throughout most of the states of North Dakota, Montana, Idaho and Washington. In earlier times the work was done by means of a team and a single-bottom plow throwing up a few furrows. Later when the pneumatic-tired industrial tractor came into vogue, it supplanted the team, pulling either a two- or three-bottom plow. Tractors of this type continued in use until the advent of the crawler tractor. The effectiveness of plowed fire guards is determined by the number of furrows, but at best they give only partial protection because of the ability of fire to jump a narrow guard.

For some years we have been constructing practically all fire guards on the Northern Pacific with one of three machines—a heavy-duty, fire-guard discer, built and purchased for that work; a bulldozer; or, in certain localities, a heavy steel, wedge-shaped drag. The fire-guard discer is most effective in prairie country where ground conditions are comparatively free of field stone, surface rock, heavy timber or brush. Our discers are all double units, with each row consisting of six discs 28 in. in diameter, the whole machine weighing approximately 4700 lb. These are towed by a crawler tractor, usually of the 80-hp. class.

As received from the manufacturer, and as first used by us, discers did not have wheels or attachments for lifting the discs to cross paved highways, for moving light, or for other purposes where discing was not wanted. Consequently we developed apparatus in our own maintenance shop, consisting of steel wheels on journals and axles, the journals being eccentric to the axles. An arrangement was installed to lower and raise the discs mechanically, which was operated by the power take-off on the tractor. Each discer has apparatus for either cable or hydraulic operation.

Where ground conditions do not permit use of the heavy-duty discers, angledozers are generally employed. Fire-guard construction by this method is best done in rough country where scab rock, field stone, brush or timber exist. In mountainous territory where slopes are steep, and there is much rock and heavy timber, we employ a heavy-pointed, wedge-shaped steel drag. Under such conditions the drag is more effective than the angledozer and can be handled with a smaller tractor. Both the tractor and the drag can be loaded on push cars for crossing bridges or to move between jobs.

All three of these types of machines construct a fire guard not less than 7 ft. wide that presents an effective barrier and has contributed materially to the reduction of fires. In certain localities, particularly where cheat grass prevails, which is exceedingly inflammable when dry, a double fire guard is constructed, the two guards being located some distance apart.

Hazards of Back-Siphonage

What is back-siphonage in plumbing systems? What are the hazards involved? What can be done to prevent it?

May Transmit Diseases

By Roscoe H. Goeke

Senior Assistant Sanitary Engineer, U.S. Public Health Service, Chicago

The flow of water or other liquids into the distribution pipes of a potable water supply from any but its intended source is defined as "back-flow". Back-siphonage is one type of back-flow, and is caused by a vacuum in the supply line. Such a vacuum or negative pressure could be caused by a break in the supply pipe, by draining the system for repairs, by using pipe sizes that are too small for peak loads, or by heavy draughts such as might be caused by fires.

Since the amoebic dysentery outbreak during the Chicago World's Fair in 1933, which was attributed to improper plumbing, attention has been focused on the dangers incident to defective installations. The hazard from contaminated water being drawn into the distribution system, thereby polluting the water supply, is obvious. Water-borne diseases, such as typhoid fever, dysentery, cholera and the common diarrheas can easily be transmitted in this manner.

Plumbing connections that will permit contamination of a water supply are divided into two groups—cross connections and back-flow connections. A cross connection is a physical connection between a potable water supply and an unsafe or questionable supply. A back-flow connection exists where the point of discharge of the potable water supply piping could be or is submerged in contaminated wa-

ter or waste, so that contamination can be drawn into the potable water supply line if a partial vacuum is developed in the line.

The potable water system should be protected by breaking any physical connections between it and the sewer or unsafe supply, as the case may be. The importance of eliminating cross-connections cannot be stressed too much. This is true not only on newly-installed plumbing but also on existing installations.

When a back-flow connection exists, the condition can be corrected by the installation of an air gap of at least twice the diameter of the supply pipe between the water outlet and the flood-level rim of the receptacle. When it is not feasible to make such a physical break in the line, the use of an approved back-flow preventer is satisfactory. Back-flow preventers are also referred to as siphon breakers or vacuum breakers. Such a device is installed on the supply pipe, and is designed to allow air to enter the line if a negative pressure is imposed on it, thereby preventing contamination from being drawn in.

Check valves are not considered as positive protection against back-siphonage because of the difficulty of maintenance, the possible failure of the valves to operate, and the probability of leakage through the valves.

Every effort should be made to eliminate or correct all connections through which back-siphonage might occur so that our public water supplies are adequately protected.

Pollutes Water Supply

By J. P. Hanley
Assistant Superintendent Water Service, Illinois Central, Chicago

The hazards of back-siphonage in plumbing systems occur in connection with the omission of air gaps or vacuum breakers on the water supply inlets, which allows a return flow from the fixtures to the water main during temporary "no pressure" periods in the main. This, in turn, tends to pollute the public water supply.

The possibility of back-siphonage exists in the water supply inlets to the fixtures in the event that adequate air gaps and vacuum breakers are not provided. The preferred use, in recent years, of the direct-pressure flush instead of the tank-flush type of fixture has increased the hazard, unless vacuum breakers are installed. Vacuum breakers are fittings placed in the supply line to the toilet bowl or other fixture, which close when water is used in flushing, but open to admit air which "breaks" the vacuum when the flush is completed and thereby prevents the siphonage action that would otherwise occur under certain conditions. Wash basins, bath tubs and sinks should have the supply faucets about two inches or more above the top of the fixture. This raised position provides an air gap between the high-water level in the fixture and the faucet opening and prevents back-siphonage.

The examples given are only a few of many installations that are now required by health department and plumbing codes, and railway officers having supervision over this class of work should keep informed on the governing codes in their territory and also in regard to the U. S. Public Health Service regulations for such work as it effects interstate carriers.

The design of plumbing fixtures should be carefully considered with particular reference given to eliminating hazards that might occur from back-siphonage. Plumbing supply manufacturers are aware of the increased regulations to prevent siphonage, and are including built-in prevention accessories in many of their lines. It is more economical to use this type of fixture when the original installation is made than to remedy doubtful conditions later by cutting in vacuum breakers or by changing the piping.

Sand in Crushed Stone Ballast

*What are the advantages or disadvantages of adding sand to crushed stone ballast? If added, what type and percentage of sand should be used? Why?**

Sees Few Advantages

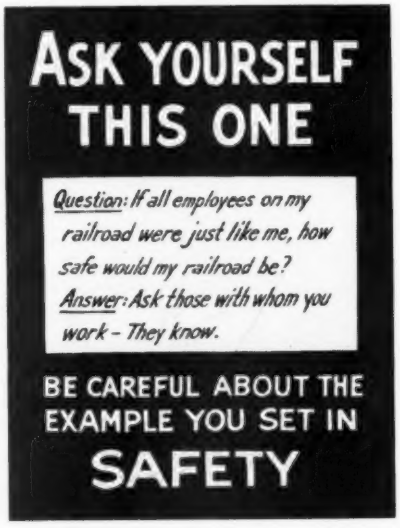
By Roadmaster

When I consider locations around water stations, interlocking plants, switching leads and entrances to and exits from passing sidings, where we have had to crib out and clean engine sand from stone ballast, I would say that adding sand to crushed stone ballast is a bad proposition.

However, since it is conceivable that the use of sand would produce a more compact and homogeneous mass for holding the ties in position, I can readily see where sand mixed with stone aggregate would make a good support for the track, providing there was not sufficient rain to churn such ballast sections into mud.

Any sand that is applied to crushed-stone ballast should be free from loam, and the combination of sand and crushed stone should be such that it is permeable to the flow of water. The quantity of sand should be sufficient to fill the voids in the stone ballast. Such ballasted sections will hold the rail from running, providing the rail is sufficiently anchored.

As a general proposition, however, except for special locations, it is my opinion that stone ballast should be free from sand.


ASK YOURSELF THIS ONE
Question: If all employees on my railroad were just like me, how safe would my railroad be?
Answer: Ask those with whom you work - They know.
BE CAREFUL ABOUT THE EXAMPLE YOU SET IN
SAFETY

This Poster, No. 285, Constitutes the June Installment of the "All the Year—Every Year Safety Program" of the Safety Section, Association of American Railroads

Why Add Sand?

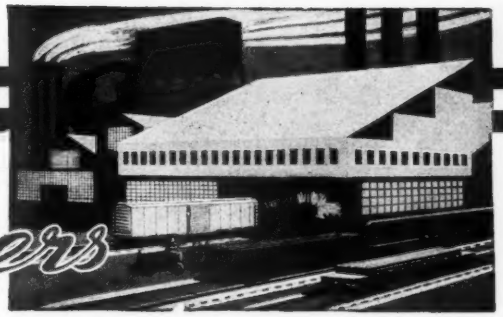
By W. H. Sparks
General Inspector Track, Chesapeake & Ohio, Russell, Ky.

The addition of sand to stone ballast is a new idea to me. On our railroad we try to keep our ballast clean by removing all sand, dirt and cinders. If we don't fork our stone ballast or use Moles to remove the dirt, our track gets sloppy and out of surface as well as having a poor appearance.

I can understand the addition of sand to gravel ballast if the pebbles are too big, but why add it to stone? If this is some new kind of ballast that somebody is using I would certainly be interested in the results.

* Additional material has been received on this question but because of its scope it is being withheld for publication in a subsequent issue.

PRODUCTS of Manufacturers



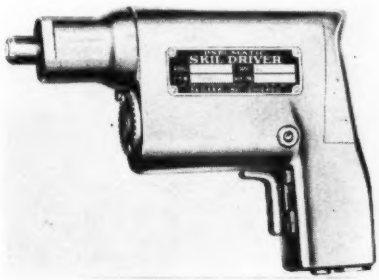
(For additional information on any of the products described in these columns, use postcards, page 545)

Skilsaw Air Tools

SKILSAW, Inc., Chicago, has announced its entrance into the pneumatic tool field with a line of 28 new models to include pneumatic hammers, drills, screw drivers, nut runners and die grinders. These tools, to be known as pneumatic Skil tools, will be produced at a recently acquired manufacturing facility at Aurora, Ill., leaving the Chicago plant of Skilsaw free to continue the production of electric Skil tools.

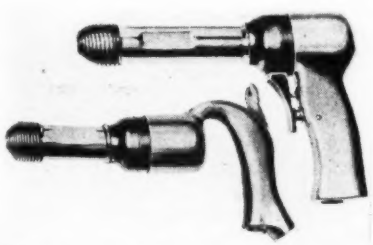
The pneumatic drills, screw drivers and nut runners are compact and light, the largest of these models being 7½ in. long—while the heaviest weighs only 2¾ lb. They feature heat-treated, alloy-steel gears and shafts and a rotor of advanced design and are said to be capable of withstanding severe use. The screw drivers and nut runners are each available in three sizes with speeds of 800, 1300, and 2100 r.p.m. The drills are produced in seven models with speeds ranging from 800 to 10,500 r.p.m. Patented ball-rolling adjustable clutches, which, according to the manufacture, will last as long as the tool, are provided on the screw drivers and nut runners.

The pneumatic grinders are available in three models and are intended for die grinding, burring and rotary filing and for use with wire-size drills. They are reported as having free speeds of 25,000 r.p.m., made possible by the use of a patented rotor together with extra large, widely-spaced ball bearings. These units are 7 in. in length and 1½ in. in diameter and weigh slightly more than 1 lb. each.



One of the Pneumatic Skil Screw-Drivers

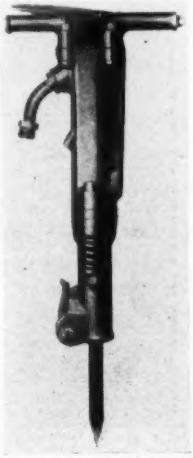
The pneumatic hammers are available in three sizes with four models in each size. These tools are adaptable for mainy applications including riveting, light chipping, beading, calking, gouging and star drilling. They are available with offset or grip handles and with Parker taper or hexagon nozzles. Tapered clearance in the throttle valve seats is said to provide accurate air metering for controlled blows.



The Pneumatic Skil Hammers Are Available With the Offset Handle (Above) or the Grip Handle (Below)

New Paving Breaker

THE Ingersoll-Rand Company, Phillipsburg, N. J., has announced a new pneumatic paving breaker, the PB-8, which is designed for heavy-duty demolition work and general paving breaking jobs. The company asserts that the new kicker-port valve used in the PB-8 increases the efficiency and striking power of the machine. A metering device furnishes lubrication for all working parts, and a large oil reservoir in the handle provides an adequate oil reserve. Four-bolt construction is said to assure a rigid joint between the handle and the cylinder, and reverse buttress threads on the fronthead bolts provide adequate tightness without overstressing the bolts.



An improved throttle valve is said to allow gradual entrance of the air and to permit smooth starting. Other features of the PB-8 include a block-type piston; a long anvil-block bearing designed to maintain correct alinement between the cylinder and the fronthead, and a long handle to provide a large gripping surface for the operator. The PB-8 may be converted into a pile driver or a spike driver by changing frontheads.

McGarry Hydrant

RAILROAD Products Company, Cincinnati, Ohio, is now producing a hydrant for use in watering passenger coaches, either in yards or at station platforms, which has been designed to meet not only the requirements of the United States Public Health Service, but also the health standards of various states and municipalities. Known as the McGarry Hydrant, this product is the result of five years experimentation on types of hydrants that would conform to the U.S.P.H.S. directive prescribing certain requirements for hydrants to be used in supplying passenger cars with water.

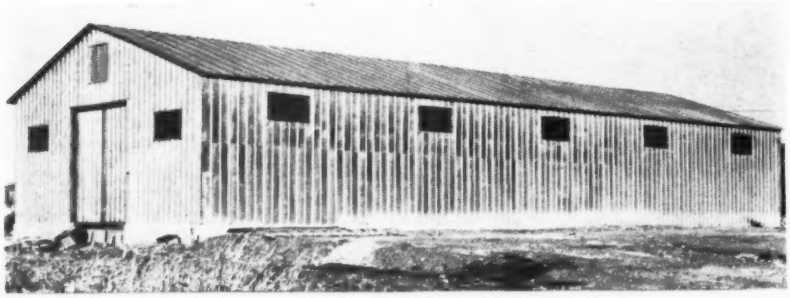
The new hydrant is designed to eliminate all drain water from the hydrant standpipe, and is one in which neither stored water nor water contaminated by outside sources can enter the flowing stream when water is being delivered. It is constructed with a reservoir into which all water in the completely-enclosed hydrant standpipe will drain after use. This reservoir contains an ejector unit, consisting of a float, a pilot valve and an ejector. As waste water drains from the hydrant standpipe into the reservoir, the float rises until, at the top

The McGarry Hydrant, Showing Outlet Nozzle Fully Covered to Prevent Exterior Contamination

positions, it actuates the ejector, causing all drain water to be ejected through a tube of which the discharge opening is located on top of the hydrant, 4½ in. above the drain ports. The drain water can then flow away from the hydrant into a sewer or french drain. As the water is discharged, the float returns to its lower position. The 4½-in. air gap is said to constitute further assurance that no contaminated water can enter the hydrant reservoir. An additional safeguard is provided by protecting the outlet nozzle with a cover.

Aluminum-Covered Steel Frame Building

THE BUTLER Manufacturing Company, Kansas City, Mo., has announced production of a new aluminum-covered building supported on a rigid steel frame. It is said that this building is especially desirable as a shelter exposed to the corrosive effects of locomotive stack gases. The building is produced in one width, 40 ft., and has a standard height of 14 ft. The length may be extended in multiples of 20 ft., and two or more buildings may be joined, side by side, for additional width. At the end of each building are two windows, a louver ventilator, and a 12-ft. sliding door. Additional side windows may be specified. The aluminum covering is deeply corrugated on 12-in. centers and is heavier than 24 gage. Simple design and assembly are said to permit dismantling and re-erection at another location.

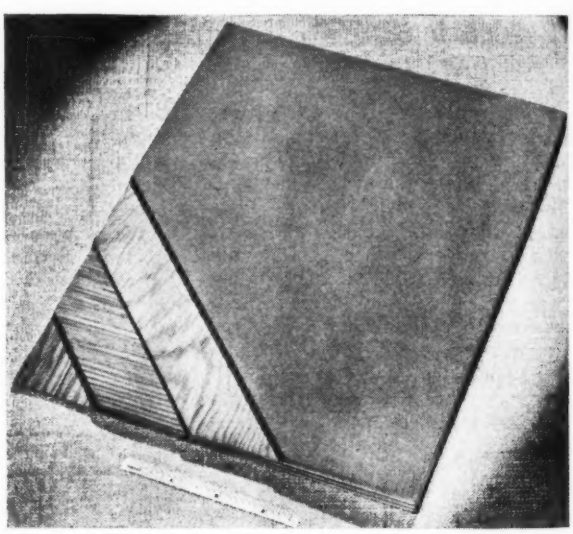


One of the New Butler Aluminum-Covered Steel Buildings

"Plywood Plus"

THE development of a new panel material consisting of plywood with a smooth, durable and relatively hard surface added has been announced by the Douglas Fir Plywood Association, Tacoma, Wash. Known officially as Welchboard, this new product has been referred to informally as "plywood plus." The coating that is applied to plywood to form Welchboard consists of a smooth, homogeneous layer made of pulverized wood fiber impregnated with waterproof resin and bonded permanently to the plywood by "setting" or polymerizing the material in large presses that apply both heat and pressure. It is said that the smooth surface thus provided serves as a base for the finest of finishes.

In surface appearance, the new material is about the color of the wood from which it is made—light tan in the case of Douglas fir—but uniform and without grain pattern. Only exterior-type plywood, bonded with completely waterproof adhesives, is utilized as a base for Welchboard. Thus, since the binder used in the surface is likewise waterproof, the finished material is suitable for outdoor as well as indoor use. It is said that the material will withstand repeated wettings, long-time soakings or even boiling. The product can be cut and fastened with ordinary carpentry tools and can be glued to framing members when desired. It is now available only in limited quantities, but volume production is scheduled to begin within six months.



Cutaway Sample of Welchboard, Showing the "Extra Ply" That Is Provided by the Surface Application

One-Man Chain Saw

THE Homelite Corporation, Port Chester, N.Y., has announced the development of a new one-man, high-cycle, electric chain saw designed for use with the Homelite Models 24 and 25 high-cycle portable gasoline-engine-driven generators. The new saw has a capacity up to 20 in., is 38 in. in length and weighs 27 lb. complete. Pressure lubrication is provided for all moving parts including the gears and saw chain. The chain is driven by a 2½-hp., 180-cycle, 3-phase, brushless electric motor with a

(For additional information on any of the products described on this page, use postcards, page 545)

grounded connection. Sealed ball bearings support the motor shaft and sprocket shaft.

This saw is said to afford one-man operation for accurately cutting timbers up to 20 in. with reduced operator fatigue through the elimination of weight and vibration. It is claimed that the saw may be used at any angle and, due to its small size and light weight, is especially adapted for use in restricted locations. Two-man operation, if desired, may be obtained by attaching a helper handle at the end opposite the motor.

The Model 24 high-cycle generator, with a capacity of 2500 watts and a weight of 129 lb., operates one of the new saws, while the Model 25, with a capacity of 5000 watts and a weight of 171 lb., is capable of operating two of them.

Illustrating Use of the Homelite One-Man, High-Cycle Electric Chain Saw

Improved Gage Holder

MORRISON Railway Supply Corporation, Buffalo, N. Y., announces that a number of improvements have been made in the Morrison Adjustable Gage Holder, resulting in a strength increase of more than 100 per cent. It is said that the improved model has successfully withstood a pull of over 45,000 lb. in laboratory tests.

The gage holder consists of a wing plate, designed to be fastened to two adjacent ties, a tension rod threaded at one end and welded to the wing plate, and a jaw casting which fits over the base flange of the rail. To install the plate, the jaw casting is fitted to the outside base flange of the rail between two ties, after which the wing plate is placed on the ties inside the rail with the tension rod passing under the rail and through a hole in the casting. The wing plate is then fastened to the ties by means of screw spikes, after which an adjusting nut is placed on the end of the tension rod and pulled tight.

The gage holder is said to absorb the wheel pressure exerted against the outside rail on curves, thereby relieving the strain on the track spikes and eliminating the consequent enlargement of the spike holes in the ties. The manufacturer recommends the use of these appliances wherever excessive wheel pressures are exerted against rails, including those at turnouts. Also, the holders are recommended for holding guard rails in place. In this application, the wing plate is applied at the ends of the ties with the jaw casting engaging the guard rail on the inside of the running rail.

An Application of the Morrison Adjustable Gage Holder

Tie-Plate Drive Spike

THE Oliver Iron & Steel Corp., Pittsburgh, Pa., has developed a threaded-type drive spike for use with tie, switch, and gage plates and at certain other locations in the track. Designed to fit ¾-in. holes without the necessity of reaming them, the new spike has a threaded shank 6 in. long and 23/32 in. in diameter, and has a square head.

Due to the threaded design, the spike turns as it is driven into prebored, ⅜-in. or 7/16-in. holes without, it is said, breaking the wood fibres. When in position, it is claimed that a vertical pull of approximately 13,000 lb. is required to withdraw the spike from a treated oak tie, although it may be readily turned out of the tie by means of the square head. It is said the spike may be readily employed as a rail-holding spike, and for fastening switch stands, self-guarded frogs, and steel guard rails on bridges.

The Oliver Threaded-Type Drive Spike

(For additional information on any of the products described on this page, use postcards, page 545)

Weed Burner

THE Woolery Machine Company, Minneapolis, Minn., has announced a new model portable weed burner, known as Model AJX, which burns a 2-ft. swath and weighs approximately 100 lb. This burner is mounted on two standard bicycle wheels, and is said to be especially adapted for use in yards, along fence rows, for melting snow and ice at switches and for thawing the bottoms of hopper cars prior to unloading.

The fuel tank, of 9 gal. capacity, is located at the center of gravity so that the balance of the unit remains the same regardless of whether the tank is full or empty. The burner is swivel-mounted so that it may be moved to place the flame on either side of the machine, while the burner head may be turned as necessary to permit the machine to be used for thawing cars.

The AJX is powered by a Briggs & Stratton 1½-hp. engine which develops an atomizing pressure of 100 lb. It operates on No. 1, 2 or 3 fuel oil and the rate of consumption is said to be 7 gal. per hr.

The Woolery Model AJX Weed Burner

Clamp-Master Kit

THE Punch-Lok Company, Chicago, is offering a new Clamp-Master kit that is said to provide a simple, easy and inexpensive method of clamping, splicing, mending and banding. The kit contains a Model P-38 Clamp-Master tool for tensioning and locking all clamps, 31 flat strip-steel clamps of assorted sizes and 14 open-end clamps for use where the ends of the object to be clamped are obstructed. Among the applications of the Clamp-Master kit are hose clamping and maintenance work of a general nature, such as repairing splits or breaks in pipes, posts, ladder rails, shovel handles and other items. It is said that, in many cases, the broken piece can be repaired in a few minutes. Other applications include cable splicing, tying conduits to pipe lines, repairing cross arms and similar uses. It is said that the clamping tool weighs less than 1 lb., is compact for use in confined spaces, and that no special skill is needed to operate it.

The Clamp-Master Kit. Inset—Punch-Lok Clamp Being Applied to a Hose and Fitting

Straight-Web Sheet-Piling Sections

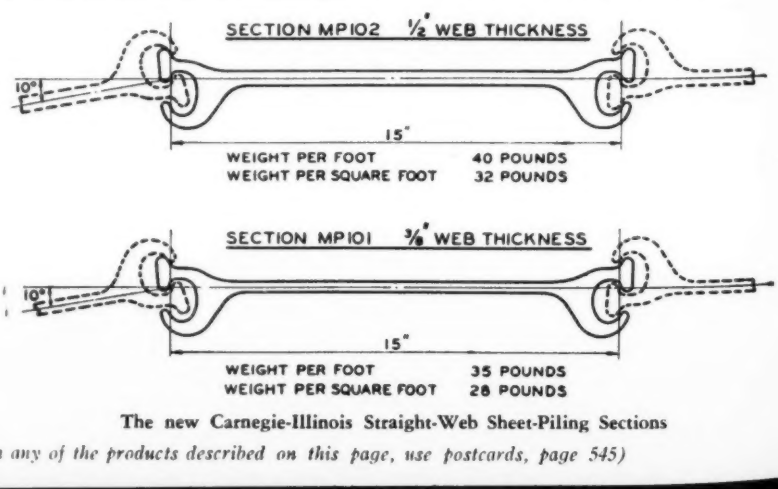
THE Carnegie-Illinois Steel Corporation, Pittsburgh, Pa., has developed two new sections of heavy-duty, straight-web sheet piling, each of which affords a saving in weight of approximately 3 lb. per sq. ft. compared with older sheet-piling sections manufactured by this company. The new sections, known as MP-101 and MP-102, weigh 28 lb. and 32 lb. per sq. ft., respectively, and are said to offer an interlocked tensile strength of approximately 8,000 lb. per lin. in.

The design of the new piling is such that it lends itself to use for special applications where welded or riveted connections are required. When assembled in pile-wall construction, the new sections may be driven in a straight line or deflected as much as 10 deg. per section to present a curved appearance.

Airco Cutting Torch

ANNOUNCEMENT has been made by the Air Reduction Sales Company, New York, that production of the Airco Series 9,000 cutting torch, discontinued during the war years, has been resumed. In this model, which measures 21 in. in length and weighs 3 lb. 4 oz., the torch head is made of monel metal, the tubes are composed of stainless steel and all torch connections are silver-brazed to afford leak-proof service.

A total of 22 interchangeable cutting tips are available for the Series 9,000, and are said to make it adaptable for a wide variety of hand-cutting operations. Although the torch is supplied with a 75-deg. or 90-deg. head, straight heads may be furnished at the option of the purchaser.



The new Carnegie-Illinois Straight-Web Sheet-Piling Sections

(For additional information on any of the products described on this page, use postcards, page 545)

Changes in Railway Personnel

General

J. F. Davison, assistant engineer on the Canadian National, at Montreal, Que., has been appointed assistant transport economist, with the same headquarters.

Edward A. West, general manager of the Denver & Rio Grande Western, at Denver, Colo., and an engineer by training and experience, has been elected a vice-president.

John G. Woodall, trainmaster of the Southern, at Birmingham, Ala., and an engineer by training and experience, has been promoted to superintendent of terminals, with the same headquarters.

M. R. Black, division engineer on the Cincinnati division of the Louisville & Nashville, has been appointed assistant to the superintendent of the Montgomery and New Orleans division, with headquarters at Mobile, Ala., a newly-created position.

B. A. Allen, assistant general superintendent of the British Columbia district of the Canadian National, and an engineer by training and experience, has been appointed general superintendent of the same district, with headquarters at Vancouver, B. C., succeeding **W. T. Moodie,** also an engineer by training and experience, who has retired.

Edward B. Stanton, assistant general manager of the Spokane, Portland & Seattle, at Portland, Ore., and an engineer by training and experience, has been promoted to vice-president and general manager, with the same headquarters.

Edward B. Stanton

Mr. Stanton was born at San Luis Obispo, Cal., and received his higher education at St. Mary's College, St. Mary's, Cal. He entered railway service in construction work with the Southern Pacific in 1922. From 1924 to 1927 he was engaged in private construction work, and in the latter year he joined the Northern Pacific's engineering and operating department in the western territory. In 1935 he was transferred to the Camas Prairie (controlled jointly by the Northern Pacific and Union Pacific), at Lewiston, Ida. Returning to the N. P. in 1939, he served successively as roadmaster, trainmaster and in the engineering department on the Spokane (Wash.) division. He became associated with the S. P. & S. (owned jointly by the Great Northern and N. P.) in 1943 as engineer maintenance of way, and in October, 1946, he was appointed assistant general manager.

Engineering

Carl B. Smith, engineer of tests on the Boston & Maine, has retired.

J. D. Free has been appointed office engineer on the Atlantic Coast Line, with headquarters at Atlanta, Ga.

R. W. McMullen, assistant division engineer on the Seaboard Air Line, at Jacksonville, Fla., has resigned.

F. H. McGuigan, 3rd, instrumentman on the Missouri Pacific, at Coffeyville, Kan., has been appointed assistant engineer, with headquarters at St. Louis, Mo.

T. E. Reyman has been appointed architect of the Atchison, Topeka & Santa Fe, with headquarters at Amarillo, Tex., succeeding the late **L. F. Borden.**

J. D. Worthing, division engineer on the Northern Pacific, at Duluth, Minn., has been transferred to Glendive, Mont.

F. Malagamba, engineer maintenance of way of the National of Mexico, has been appointed chief engineer, with headquarters at Mexico City, D. F.

W. E. Ward has been appointed assistant cost engineer on the Chesapeake & Ohio, with headquarters at Raleigh, W. Va., succeeding **F. C. Seivers,** whose promotion to supervisor or track on the Piney Creek subdivision is reported elsewhere in these columns.

F. N. Fuller, roadmaster on the Dallas and Austin divisions of the Southern Pacific, has been appointed senior assistant engineer in the office of the chief engineer, at Houston, Tex.

W. E. Fuhr, assistant engineer on the Chicago, Milwaukee, St. Paul & Pacific, at Aberdeen, S. D., has been appointed assistant division engineer, with headquarters at Mason City, Iowa.

J. A. Lahmer, senior assistant engineer of the Missouri Pacific, at St. Louis, Mo., has retired. **D. X. Greenberg,** assistant engineer, at Wichita, Kan., has been transferred to St. Louis, to succeed Mr. Lahmer.

E. L. Anderson has been appointed assistant chief engineer, maintenance, on the St. Louis-San Francisco, with headquarters at Springfield, Mo., with jurisdiction over maintenance of way and structures, reporting to the chief engineer on engineering matters, and to the general manager on operating matters.

P. H. Smith, assistant to the engineer of tests of the Chicago, Burlington & Quincy, has been promoted to engineer of tests, with headquarters as before at Aurora, Ill., succeeding **Frank Zeleny,** who has retired after 48 years of continuous service.

Luis Reina has been appointed chief of the department of maintenance of way of the National of Mexico, with headquarters at Mexico City, D.F. He was formerly assistant chief engineer of the Southern Pacific of Mexico, at Guadalajara Jalisco.

W. W. Wilson, whose retirement as chief engineer of the Gulf, Colorado & Santa Fe (part of the Atchison, Topeka & Santa Fe), with headquarters at Galveston, Tex., was reported in the May issue, was born at Hearne, Tex., on January 2, 1882, and was graduated by the University of Texas in 1906 with the degree of C. E. Prior to entering the university in 1902, he entered the service of the G. C. & S. F. and served as a track laborer and as an axeman in the engineering department. In June, 1906, he returned to the G. C. & S. F. as a transitman on construction and maintenance, and in April, 1909, he was promoted to assistant engineer on the Beaumont division. In January, 1910, Mr. Wilson was appointed division engineer of the Galveston division, with headquarters at Galveston; and from November, 1918, until April, 1920, during the period of federal control of the railways, he served as engineer maintenance of way of the Galveston Terminal Association. He returned to the G. C. & S. F. on April 20, as a division engineer at Galveston, and was later transferred to the Southern division, with headquarters at Temple, Tex. On August 15, 1930, he was promoted to district engineer at Galveston. In the latter part of 1939, the position of district engineer at Galveston was abolished and Mr. Wilson was appointed division engineer with the same headquarters. In April, 1941, he was appointed acting chief engineer, and in June, 1941, he was advanced to chief engineer of the G. C. & S. F. at Galveston.

W. W. Wilson

(*Continued on page 606*)

(*Continued from page 605*)

John F. Kerwin, cost engineer in the engineering department of the general office of the Boston and Maine, has been promoted to assistant engineer, with headquarters at Greenfield, Mass., replacing the late **Ralph Q. Hamilton.**

W. V. Kerns, superintendent of bridges and buildings on the Chicago & North Western, at Mason City, Iowa, has been promoted to division engineer of the Black Hills division, with headquarters at Chadron, Neb., succeeding **H. L. Barr,** who has been transferred to the Iowa division, with headquarters at Boone, Iowa, where he replaces **C. H. Wells,** who has retired.

L. E. Bates, whose appointment as engineer maintenance of way of the Southern division of the Atlantic Coast Line, with headquarters at Jacksonville, Fla., was reported in the May issue, entered the service of the A. C. L. as rodman in the construction department and served in various other engineering positions until January 1, 1934, when he was promoted

L. E. Bates

to junior engineer at Jacksonville. He went to Wilmington, N. C., as assistant engineer in 1937, and was advanced to division engineer of the Southern division on December 1, 1943. Mr. Bates became roadmaster of the Wilmington district on February 1, 1946, which position he held at the time of his recent promotion to engineer maintenance of way at Wilmington.

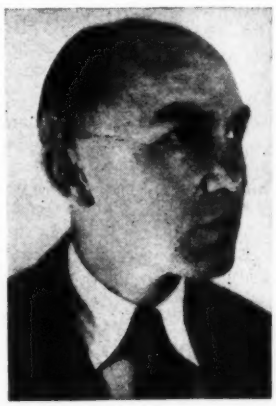
James B. Clark, assistant division engineer on the Louisville & Nashville, at Birmingham, Ala., has been promoted to division engineer, Cincinnati division, succeeding **M. R. Black,** whose promotion to assistant to the superintendent of the Montgomery and New Orleans division is reported elsewhere in these columns. **G. R. Sproles,** assistant division engineer, at Evansville, Ind., has been transferred to Birmingham, succeeding Mr. Clark. **John Leinard,** draftsman at Louisville, Ky., has been promoted to assistant engineer, Knoxville and Atlanta division, with headquarters at Knoxville, Tenn., succeeeding **J. P. Bolling,** who has been appointed assistant engineer at Louisville. **F. H. Boulton,** assistant engineer at Louisville, has been advanced to assistant division engineer, Evansville division, with headquarters at Evansville, succeeding Mr. Sproles. **H. B. Lewis,** draftsman at Louisville, has been promoted to assistant engineer, Eastern Kentucky division, with headquarters at Ravenna, Ky., replacing **Charles Yarbrough.**

Harry F. Smith, bridge engineer of the Norfolk & Western, with headquarters at Roanoke, Va., has been promoted to engineer of bridges and buildings. **H. C. Charlton,** crossing engineer at Roanoke, has been promoted to assistant engineer of bridges. **J. F. Newsom, Jr.,** maintenance engineer at Roanoke, has been advanced to assistant engineer of buildings. All three occupy new positions. **W. I. King,** resident engineer at Norfolk, Va., succeeds Mr. Charlton as crossing engineer at Roanoke. **R. D. Simpson,** transitman, is Mr. Newsom's successor as maintenance engineer at Roanoke. **J. S. Felton, Jr.,** transitman at Bluefield, W. Va., succeeds Mr. King as resident engineer at Norfolk.

Mr. Smith was born at Clifton Forge, Va., on November 19, 1898, and received the degree of B. S. in civil engineering from Virginia Polytechnic Institute in 1923. He first entered the service of the Norfolk & Western at the Roanoke shops in 1917, working there prior to and during summer vacations while attending college. In June, 1923, Mr. Smith was assigned to permanent service in the engineering department as rodman, subsequently serving as inspector, transitman and draftsman. In May, 1935, he was appointed resident engineer, in which capacity he served until October, 1941, when he became crossing engineer. He held the latter position until January, 1943, when he was appointed assistant engineer, becoming bridge engineer in December, 1945, the position he held at the time of his recent promotion to engineer of bridges and buildings.

William J. Turner, whose appointment as assistant chief engineer of the Atlantic Coast Line at Wilmington, N. C., was reported in the May issue, was born in Pike County, Ala., on January 16, 1902. After receiving a primary and high school education in that county, Mr. Turner was graduated from Alabama Polytechnic Institute in June, 1925, with the degree of B. S. in civil engineering. Entering railroad service on June 1, 1925, with the A. C. L. as rodman in the construction department at Waycross, Ga., he became transitman on construction work in Florida the following September 1. Three years later he was appointed junior engineer in the chief engineer's office and on February 1, 1930, he was appointed assistant engineer at Jacksonville, Fla., becoming senior assistant engineer six months later. Mr. Turner was appointed office engineer at Jacksonville on June 1, 1933, becoming division engineer of the Southern division on May 1, 1940, and acting engineer of design at Wilmington on August 1, 1942. Mr. Turner was advanced to principal assistant engineer on September 16, 1944, and engineer maintenance of way of the Southern division at Jacksonville on June 1, 1945, holding the latter position until his recent promotion to assistant chief engineer at Wilmington.

M. W. Clark, whose appointment as principal assistant engineer of the Atlantic Coast Line, with headquarters at Wilmington, N. C., was reported in the May issue, was born at Savannah, Ga., on April 5, 1908, graduated from the Citadel, Charleston, S. C., with the degree of bachelor of science in civil engineering, and entered the service of the A. C. L. as a chainman in the valuation department at Wilmington on June 15, 1930. He was appointed rodman at Jacksonville, Fla., the following September 15, becoming junior draftsman at Wilmington three months later. On September 1, 1935, he became senior draftsman and on February 1, 1936, assistant supervisor of building repairs at Rocky Mount, N. C. Mr.



M. W. Clark

Clark was appointed junior engineer at Wilmington on February 1, 1937, and 14 months later he became assistant engineer at Savannah, Ga. On February 1, 1939, he was appointed office engineer at Savannah, becoming supervisor building repairs there on October 16, 1944. Five months later Mr. Clark went to Wilmington as office engineer, which position he held until his recent appointment as principal assistant engineer at Wilmington.

Track

A. Hart has been appointed roadmaster on the Canadian Pacific, with headquarters at Yorkton, Sask.

C. R. Woodley has been appointed roadmaster on the Chicago & Illinois Midland, with headquarters at Springfield, Ill.

Louis W. Anderson, roadmaster on the Chicago, Milwaukee, St. Paul & Pacific, with headquarters at Rockwell City, Iowa, has retired.

F. C. Mackay, roadmaster on the Canadian National, with headquarters at Edmonton, Alta., has retired. **G. C. Barnett,** roadmaster at Regina, Sask., has retired.

I. V. Eby has been appointed supervisor of track on the Elgin, Joliet & Eastern, with headquarters at Kirk Yard, Gary, Ind., succeeding **G. A. Beahm,** who has resigned.

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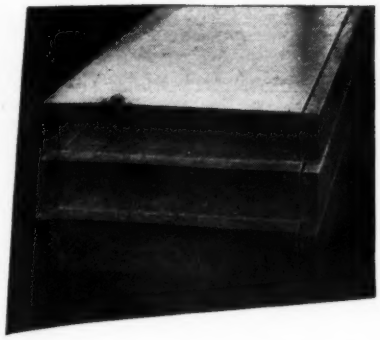
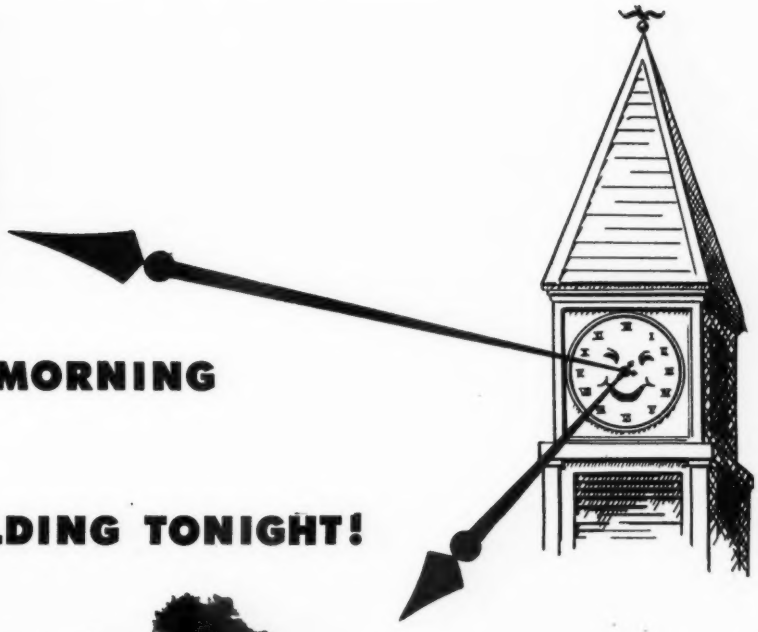
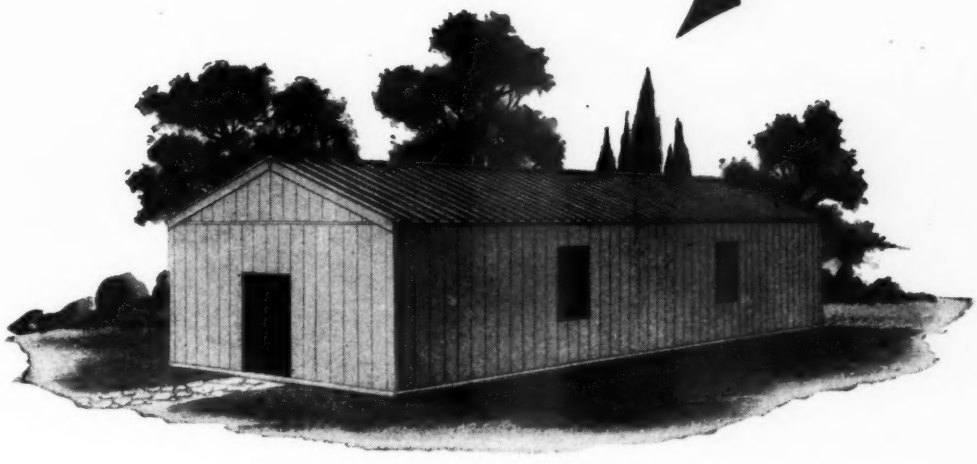


STEEL THIS MORNING

...A BUILDING TONIGHT!





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See for yourself how easily and economically STEELOX Buildings can solve your building problems. Use them for offices, tool houses, utility buildings and wherever else you need a permanent-type, easily erected structure. STEELOX Buildings are prefabricated in a wide range of standard sizes to fit your requirements. Write for prices and complete information. Armco Drainage & Metal Products, Inc., 2465 Curtis Street, Middletown, Ohio.

ARMCO

ARMCO STEELOX BUILDINGS

(*Continued from page 606*)

L. E. Crance, supervisor of track on the Allegheny and Hot Springs subdivisions of the Chesapeake & Ohio, with headquarters at Clifton Forge, Va., has retired. Mr. Crance is succeeded by **R. B. Wallace,** whose promotion was reported in the May issue. **F. C. Seivers,** assistant cost engineer, at Raleigh, W. Va., has been promoted to supervisor of track on the Piney Creek subdivision, with headquarters as before at Raleigh, succeeding **R. B. Grier.**

C. E. Vick, roadmaster on the Atlantic Coast Line, at Sanford, Fla., has been transferred to Albany, Ga., and **J. F. Lewis,** acting roadmaster at Sanford, has been appointed roadmaster there, succeeding Mr. Vick. **G. W. Svoboda** has been appointed acting roadmaster, with headquarters at Wilmington, N.C., succeeding **L. E. Bates,** whose promotion to engineer maintenance of way on the Southern division was reported in the May issue. **Spurgeon Marvin Burney,** roadmaster at Florence, S.C., has retired.

H. C. Kohout, supervisor of track on the Buffalo division of the Pennsylvania, at Dunkirk, N.Y., has been transferred to the Chicago Terminal division, with headquarters at Chicago, to succeed **W. B. Blix, Jr.,** resigned. **N. D. Patterson,** supervisor of track on the Toledo division, has been transferred to the Buffalo division, with headquarters at Dunkirk, succeeding Mr. Kohout. **R. H. Smith,** assistant supervisor of track on the Maryland division at Perryville, Md., has been promoted to supervisor of track, with headquarters at Toledo, Ohio, succeeding Mr. Patterson. **W. Glavin,** assistant supervisor of track on the Williamsport division, has been transferred to the Maryland division, with headquarters at Perryville, to succeed Mr. Smith, and **M. D. Brehm,** assistant on the engineer corps, Western region, has been promoted to assistant supervisor of track at Williamsport, Pa., succeeeding Mr. Glavin.

Special

R. K. Johnson, supervisor of reclamation on the Chesapeake & Ohio, has been appointed superintendent of work equipment and reclamation, a newly-created position, at Barboursville, W. Va.

Bridge and Building

A. C. Price has been appointed bridge and building master on the Bruce division of the Canadian Pacific, with headquarters at Toronto, Ont.

E. Bertram Tourtellotte, assistant bridge and building supervisor on the Boston & Maine at Greenfield, Mass., has been promoted to bridge and building supervisor, with the same headquarters, to succeed **Herbert C. McNaughton,** retired. **Wilfred H. Holland,** cost engineer at Boston, Mass., has been promoted to assistant bridge and building supervisor at Greenfield, to succeed Mr. Tourtellotte.

R. D. Kelley, assistant superintendent of bridges and buildings on the Galena division of the Chicago & North Western, at Chicago, has been promoted to superintendent of bridges and buildings, with headquarters at Mason City, Iowa, succeeding **W. V. Kerns,** whose promotion to division engineer on the Black Hills division, at Chadron, Neb., is reported elsewhere in these columns.

Obituary

Howard K. Carter, assistant division engineer on the New York Central, at Bellefontaine, Ohio, died recently.

W. D. Faucette, executive representative and chairman of the committee of research and planning, and formerly chief engineer, of the Seaboard Air Line, with headquarters at Norfolk, Va., died on May 19 at his home in Norfolk.

William Elmer, who retired in 1935 as special engineer of the Pennsylvania, at Philadelphia, Pa., died on May 6 at his winter home in Rockledge, Fla., at the age of 77.

John R. W. Davis, who retired on January 1, 1940, as chief engineer of the Great Northern, with headquarters at St. Paul, Minn., died recently at Seattle, Wash. Born on October 26, 1868, and graduated by Lehigh University in 1891, he entered the service of the Great Northern in 1903 as engineer maintenance of way. In May, 1925, he was advanced to chief engineer, the position he held until his retirement.

Robert R. Nace, chief engineer maintenance of way of the New York Zone of the Pennsylvania, with headquarters at New York, died on May 19 in St. Elizabeth's hospital, Elizabeth, N.J.

Mr. Nace was born on August 27, 1882, at Tacony, Pa. He entered railway service in December, 1901, as a rodman on the Pennsylvania, serving in that capacity until 1905, when he was promoted to transitman. He was further advanced to assistant supervisor in 1906 and supervisor in 1911, and served in that position until 1918, when he became agent at Mantua Transfer. Mr. Nace next worked as freight supervisor for the United States Railroad Administration. In the latter part of 1919 he was appointed assistant engineer maintenance of way on the Pennsylvania, and, in March, 1920, he was promoted to engineer, maintenance of way of the East Ohio division of the Central region, at Pittsburgh, Pa. He held the latter position until April, 1926, after which he served as superintendent of the Schuylkill division, with headquarters at Reading, Pa., transferring to the Indianapolis division in March, 1927. In October, 1928, Mr. Nace was appointed chief engineer maintenance of way of the New York Zone, with headquarters at New York, and, when this position was abolished in May, 1932, he was appointed engineer maintenance of way of the New Jersey division, with headquarters at New York. He was again appointed chief engineer maintenance of way of the New York Zone in June, 1934, which position he held until his death.

Association News

Metropolitan Maintenance of Way Club

The annual outing of the club will be held at the Out-o'Bounds Country Club, Suffern, N.Y., on Tuesday, June 10. An outstanding program of athletic events has been arranged, beginning at 10 a.m., with a buffet luncheon to be served at 1:30 p.m. Trains to the outing will leave via the Erie Railroad at 7:20, 8:25, and 11:25 a.m. E.D.T., and 12:49 p.m. E.D.T.

Track Supply Association; B. & B. Supply Men's Association

Replying to inquiries sent out by Lewis Thomas, director of the joint exhibit to be held at the Hotel Stevens, Chicago, by these associations on September 15-18, in conjunction with the concurrent annual meetings of the Roadmasters' and Bridge & Building Associations, 59 companies have already made arrangements for 80 exhibit booths. Among those companies that have already reserved space are nine companies that have not exhibited previously. Companies which desire exhibit space should address Mr. Thomas, director of exhibits, 59 E. Van Buren Street, Chicago.

Roadmasters' Association

A meeting of the Executive committee of the association will be held in Chicago on July 14, for the primary purpose of reviewing the committee reports to be presented before the annual meeting of the association in Chicago, September 16-18. This meeting, as last year, will be held concurrently with the annual meeting of

(*Continued on page 610*)

Meetings and Conventions

American Railway Bridge and Building Association—Annual meeting, September 16-18, 1947, Hotel Stevens, Chicago.

American Railway Engineering Association—Annual Meeting, March 16-18, 1948, Chicago.

American Wood-Preservers' Association—Annual meeting, April 27-29, 1948, St. Paul, Minn.

Bridge and Building Supply Men's Association—Joint exhibit with Track Supply Association, September 15-18, Hotel Stevens, Chicago, during concurrent conventions of American Railway Bridge and Building Association and Roadmasters' Association.

Maintenance of Way Club of Chicago—Next meeting, October 27, 1947.

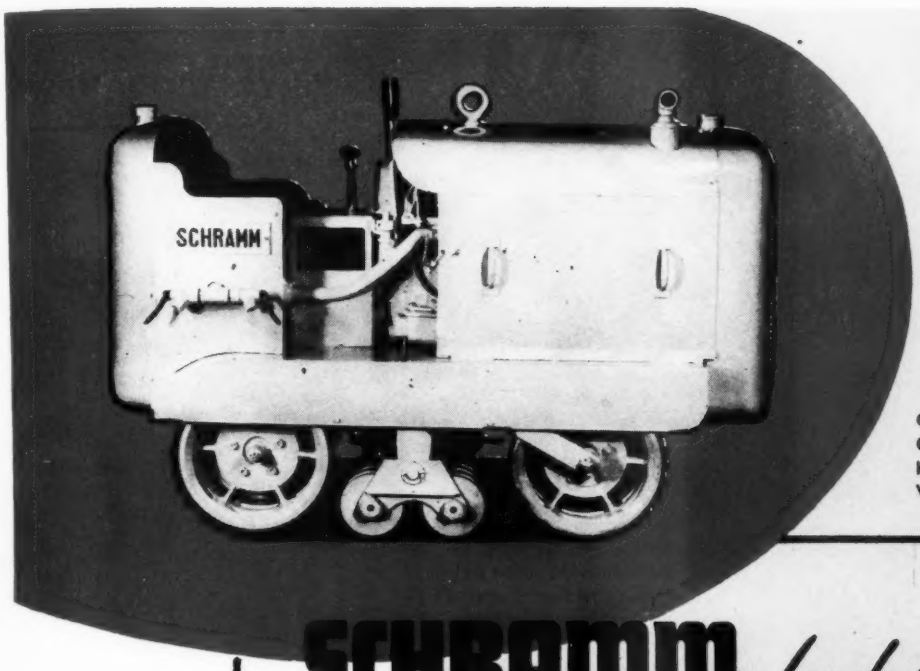
Metropolitan Maintenance of Way Club—Annual outing: Out of Bounds Country Club, Suffern, N.Y., June 10, 1947.

National Railway Appliances Association—Thirty-third annual exhibit, Chicago, March 15-18, 1948, in connection with A.R.E.A. convention.

Railway Tie Association—Annual meeting, September 23-25, 1947, Arlington hotel, Hot Springs, Ark.

Roadmasters' and Maintenance of Way Association of America—Annual meeting, September 16-18, 1947, Hotel Stevens, Chicago.

Track Supply Association—Joint exhibit with Bridge and Building Supply Men's Association, September 15-18, Hotel Stevens, Chicago, during concurrent conventions of Roadmasters' Association and American Railway Bridge and Building Association.



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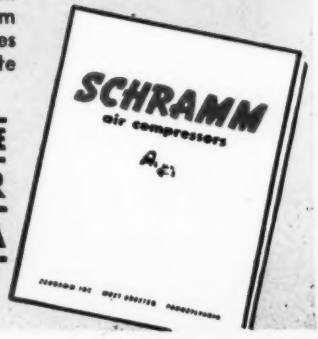
Maintenance engineers who want utility and flexibility like small 60 foot compressors because they pack ample power for four tampers and are just right for spot tamping, yet adding more units makes them adaptable to larger jobs.

Heretofore, 60-foot off-track compressors had one drawback; they were sometimes difficult to move by manpower, especially when climbing a steep hill. But now all that is past, for Schramm's Model 60 Crawler goes literally anywhere, and that means quick, easy shifting and positioning.

Another advantage of the Model 60 Crawler is the integral arrangement of power and compressor cylinders in a Ford-Mercury V-8 block. Two power and two compressor cylinders on each side mean perfect balance, and most of the replacement parts are locally procurable.

For further details about the Schramm Model 60 Crawler and all other Schramm compressors, address our Railway Sales Division for your copy of the complete Schramm catalog.



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ILLUSTRATIONS ACTUAL SIZE

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Where vehicular as well as foot traffic must be protected, the large pattern provides structural strength with safety. Gauges from three-sixteenth inch to three-quarter inch. Install it over wood or steel joists with no other support.

MEDIUM

Use medium pattern floor plate for plant or product installations on floors, steps, walkways, platforms and ramps. Thicknesses from 16 gauge to one-eighth inch. 4-Way cleans easily, drains freely... cuts out and matches with minimum waste.

SMALL

The small five-eighth inch lug pattern is an excellent safety flooring for light, mobile equipment. Its light (18 gauge) weight makes handling and installation simple and easy. Use it for all applications where weight and safety factors are important.

*TRADEMARK

Available for delivery from all leading Steel Warehouse Distributors. Write for the Inland 4-Way Floor Plate catalog.

INLAND STEEL CO.

38 S. Dearborn Street Chicago 3, Ill.

Sales Offices: Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, St. Paul

(*Continued from page 608*)

the American Railway Bridge & Building Association and a joint exhibit of the Track Supply Association and the Bridge & Building Supply Men's Association, at the Hotel Stevens, Chicago.

In the current drive for new members in the association, a total of 222 new members have been taken in since the last annual meeting.

Bridge & Building Association

President Campbell has called a meeting of the Executive committee of the association in Chicago on July 10 to review the technical committee reports now under way for presentation at the annual meeting of the association in Chicago on September 16-18. The annual meeting, which will be held at the Hotel Stevens, will, as last year, be concurrent with the annual meeting of the Roadmasters' & Maintenance of Way Association and a joint exhibit of the Track Supply Association and the B. & B. Supply Men's Association.

All members of the association are urged to continue their drive for new members, communicating either directly with the secretary, Miss Elise LaChance, 431 S. Dearborn street, Chicago, or W. F. Martens, general foreman bridges and buildings, A.T.&S.F., San Bernardino, Calif., chairman of the membership committee.

Maintenance of Way Club of Chicago

At the annual meeting of the club on Monday, April 28, reported on previously in the May issue, the following officers were elected for the ensuing year: president, G. P. Palmer, regional engineer construction and maintenance, Baltimore & Ohio Chicago Terminal; first vice-president, W. G. Powrie, engineer maintenance of way, Chicago, Milwaukee, St. Paul & Pacific; second vice-president, S. H. Shepley, supervisor of track, Elgin, Joliet & Eastern; re-elected—executive secretary, Neal D. Howard, editor, *Railway Engineering and Maintenance;* secretary-treasurer, C. R. Knowles, associate editor, Railway Engineering and Maintenance Cyclopedia; directors to serve two years; V. V. Holmberg, supervisor bridges and buildings, Chicago & Western Indiana-Belt Railway of Chicago; Milton Duberstein, chief clerk to engineer maintenance, Chicago & North Western; and Walter H. Oaklay, Jr., sales engineer, Bethlehem Steel Company.

American Railway Engineering Association

Five standing committees of the association have scheduled meetings to be held in June as follows: The Committee on Ties at Grenada, Miss., on June 5 and at Little Rock, Ark., on June 6; the Committee on Highways on June 10 at the association's headquarters, Chicago; the Committee on Economics of Railway Location and Operation on June 21 at French Lick, Ind.; the Committee on Rail

(*Continued on page 612*)

31% EASIER LIFTING

LOWER MAINTENANCE

GREATER SAFETY

LONGER LIFE

The New Improved

Simplex TYPE "A" TRACK JACKS

These new Single-acting Track Jacks retain all of the time-proved features which have made Simplex the outstanding choice of railroad men since 1899. Electrided Gibs . . . Hardened Steel Plate . . . Full Rated Lifting Capacity . . . Safe Operation in all positions—mean performance you can depend on.

In addition, they embody four new features found only in Simplex Jacks . . . features that mean still longer service life, easier lifting and greater safety.

Bulletin No. T and B47, just off the press, describes the money and labor saving features of these new Simplex Track Jacks in detail. Write for your copy today.

31% EASIER LIFTING
Shorter fulcrum center reduces effort needed to lift load.

LOWER MAINTENANCE
New Pin-Type pawl and socket construction prevents grit accumulation . . . reduces wear.

GREATER SAFETY
New safety Thumb guard prevents finger injuries when tripping jack.

LONGER LIFE
Larger striking surface eliminates concentration of wear at a single point.

4 SIZES . . . 15-TON CAPACITY

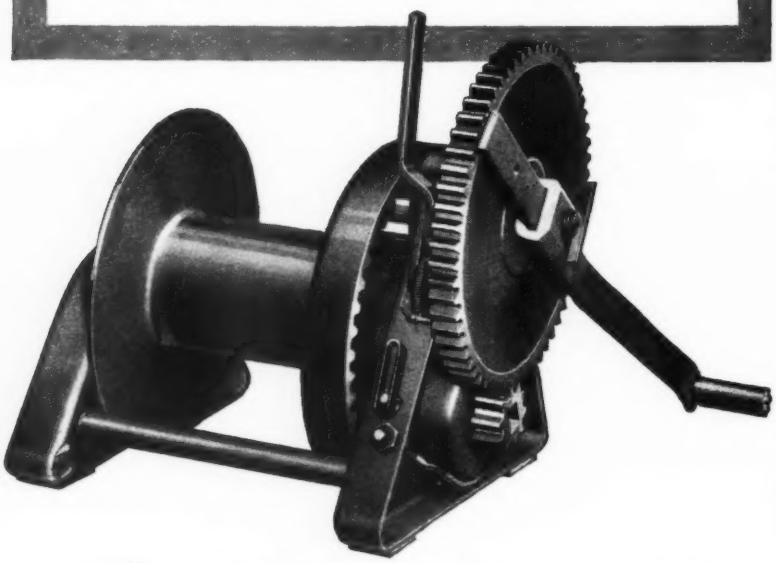
215A	5" Lift
216A	8" Lift
217A	13" Lift
218	19¼" Lift

Simplex
LEVER - SCREW - HYDRAULIC
Jacks

TEMPLETON, KENLY & CO., CHICAGO 44, ILLINOIS
General Office: 1026 South Central Avenue

HOW WOULD YOU DO IT?

Can one man, with no power equipment . . . | . . . unload this heavy, bulky cast iron pipe . . . | . . . and place it in a deep trench?



The job's a cinch . . . . with

HANDIWINCH

IT'S THE "little things" that bleed the profit out of any job, if they aren't handled efficiently. When you're lifting or pulling or moving loads up to 10,000 lbs., just plain "muscle power" is always slow and costly and often inadequate . . . yet heavy motorized hoists are far too expensive.

In such situations, the American Hoist HANDIWINCH is saving thousands of dollars for thousands of users daily. HANDIWINCH is *all steel* . . . built with many "big hoist" features. One man carries it, sets it up anywhere. It weighs 95 lbs., costs $75 f.o.b. your distributor. Write for folder HW-15, giving setup suggestions and full details on HANDIWINCH uses.

American Hoist

and DERRICK COMPANY

SAINT PAUL 1, MINNESOTA

713 *Plant No. 2,* South Kearny, New Jersey

CHICAGO • PITTSBURGH • SAN FRANCISCO • NEW ORLEANS • NEW YORK

LOCOMOTIVE CRANES • HOISTS • DITCHERS • DERRICKS • CANE CRANES • BLOCKS AND SHEAVES
MARINE DECK MACHINERY • CAR PULLERS • PILE DRIVERS • REVOLVER CRANES • CROSBY CLIPS

(*Continued from page* 610)

on June 26 at the Chicago Engineers' Club. Those members of the Committee on the Economics of Railway Location and Operation who will go to French Lick via Chicago will travel over the Chicago, Indianapolis & Louisville (Monon) in the business car of J. W. Barriger, president of that road, one of the committeemen.

Committee meetings held during May included the following: Water Service and Sanitation on May 1 at Chicago; Masonry on May 5-7 at Chicago; Roadway and Ballast on May 15-16 at Montreal, Que.; Track on May 21 at Chicago; Buildings on May 22-23 at Boston, Mass.; and Waterproofing on May 29 at Chicago.

Wood Preservers' Association

The forty-third annual meeting of the association was held in Portland, Ore., April 22-24, with 496 members and guests in attendance, including many railroad men. Throughout, the program, which included 24 committee reports and 14 papers, was a succession of technical discussions devoted to the problems of the wood-preserving industry and the users of timber products.

Some of the reports and addresses of special interest to railway men included a paper by Messers. Jefferson (Nettleton Timber Company) and C. A. Rishell and H. B. McKean (National Lumber Manufacturers' Association), stressing the need for improving the mechanical service of railroad crossties; a visual report, in the form of a motion picture, by the Committee on Handling of Forest Products, of which A. E. Larkin, manager, Republic Creosoting Company, was chairman; a "lantern-slide" paper by R. M. Alpen, superintendent of wood preserving plant, Southern Pacific, on Recent Developments in Wood Preservation on the Southern Pacific; and reports on fireproofing, laminated bridge members, and bridge and structural timber.

All of the sessions of the meeting were presided over by President R. H. Rawson, consulting timber engineer, Portland, assisted by Vice-President A. J. Loom, general superintendent timber preservation and tie treating plants, Northern Pacific, Brainerd, Minn.

In the election of officers for the ensuing year, Mr. Loom was advanced to president; G. B. McGough, Bond Brothers, Louisville, Ky., was advanced from second vice-president to first vice-president; J. S. Giddings, superintendent of treating plant, A.T.&S.F., Somerville, Tex., was elected second vice-president; H. L. Dawson was re-elected treasurer; and the following were elected to the Executive committee—J. B. Akers, chief engineer, Southern; J. O. Blew, Jr., Forest Products Laboratory; and L. J. Jacobi, engineer, Detroit Edison Company, St. Paul, Minn., was selected for the convention next year, which will be held April 27-29. Following the meeting, it became necessary for Mr. Blew to resign from the Executive committee, and Ralph H. Bescher, manager, treating department, Koppers Company, Wood Preserving division, was appointed to fill the vacancy.

(*Please turn to page* 614)

REDUCE HAZARDS

MORDEN SECURITY ADJUSTABLE RAIL BRACE shown in use with the Morden Security Solid Switch Plate.

The plate provides a hook clamp extending over the top of the rail base for approximately 1", and for the full width of the plate. This construction securely clamps and holds down the inside of the stock rail,—an outstanding feature furnished only in the Morden Security Switch.

MORDEN SECURITY designs are furnished for all types of standard and special track.

We will be happy to have our engineers call on you and provide further information or demonstration of our Security products.

Morden Frog and Crossing Works CHICAGO, ILL.

Representatives in: CLEVELAND, OHIO; NEW ORLEANS, LA.; LOUISVILLE, KY.; ST. LOUIS, MO.; WASHINGTON, D. C.

Clean Cool DRINKING WATER

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MEETS REQUIREMENTS OF PUBLIC HEALTH AUTHORITIES

FOR CONSTRUCTION AND MAINTENANCE CREWS

The Dobbins PORTABLE SANITARY DRINKING FOUNTAIN protects the health and strength of workmen on any job . . . anywhere . . . with cool, clean drinking water—at the press of a button! Aids railroad, highway and building construction, repair and maintenance crews . . . miners, and all other workmen on jobs where a permanent, sanitary drinking water supply is *not* available. Banishes germ-spreading practices such as use of "common" drinking cups, open pails, dippers, etc. Four gallon capacity tank is fully insulated. Air pressure for instant flow of water is supplied with a few strokes of the pump.

DOBBINS MANUFACTURING COMPANY
DEPT. 620, ELKHART, INDIANA

DISTRIBUTORS: Some territories are open for this fast-selling item. Write for complete details.

FOUNTAIN AND ACCESSORIES • • AVAILABLE FOR IMMEDIATE DELIVERY

No. 18 — Dobbins Superbilt *Portable Drinking Fountain* less all accessories. Only **$16.00**

Salt Tablet Dispenser, 500 tablet capacity, extra **$2.75**

Adjustable, Waterproof *Carrying Strap,* extra **$1.15**

Spill Cup, to catch overflow when used indoors **$3.50**

Mounting Bracket, holds fountain to wall or floor of buildings, trucks, tractors, locomotives, etc. . **$4.50**

All prices F. O. B. Elkhart, Indiana. Circular on request.

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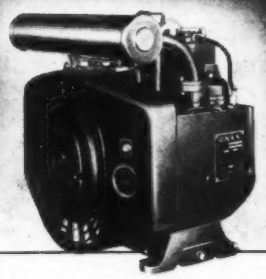
PORTABLE DRINKING FOUNTAIN

SMOOTH POWER

Two-Cylinder

The NEW ONAN AIR-COOLED 10 H.P. 4 CYCLE "CK" ENGINE



A new, light, compact, easily-installed engine of wide power range. Completely "De Luxe" equipped, easy-to-get-at controls, and many other *plus* points. Prompt delivery on early orders.

ONAN ELECTRIC PLANTS—A.C.—350 to 35,000 watts in standard voltages and frequencies; D.C.—600 to 10,000 watts, 115 and 230 volts. Battery chargers—500 to 6,000 watts, 6, 12, 24, 32 and 115 volts. ONAN AIR-COOLED ENGINES—CK: 2-cylinder opposed, 10 h.p.; BH: 2-cylinder opposed, 5.5 h.p.; 1B: 1-cylinder, 2.5 h.p.

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WRITE FOR SPECIFICATIONS

D. W. ONAN & SONS INC.
4426 Royalston Ave. Minneapolis 5, Minn.

- **HEAVY-DUTY CONSTRUCTION:** Short, sturdy crankshaft. Extra-large bearings.
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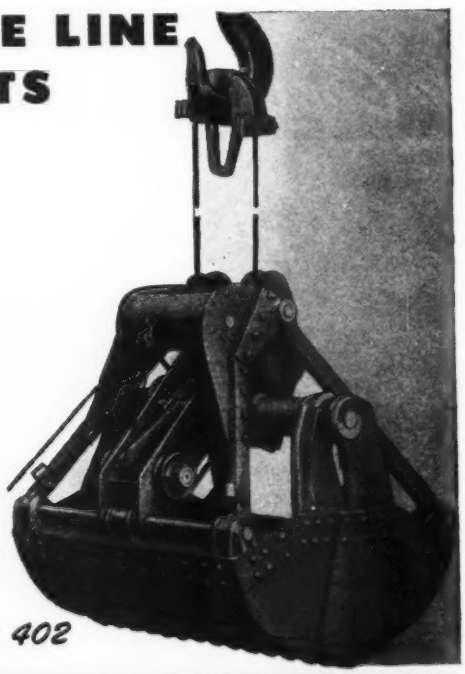
ONAN 4-Cycle ENGINES

ERIE SINGLE LINE BUCKETS



ILLUSTRATED is the hook-on type, for intermittent service. It is reeved and ready for operation on overhead traveling crane, monorail hoist, locomotive crane, derrick, ships tackle or any other hoisting device which has but a single hoisting drum available for bucket duty. Just slip the yoke over the crane hook.

Erie Single Line buckets are also available in the direct-reeved type for permanent installation. Describe your Single Line bucket need — we'll give you our recommendations for we build all types and sizes.

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ERIE BUCKETS • *A Complete Line*

Erie Steel Construction Co., 1176 Geist Rd., Erie, Pa.

BUCKETS • AGGREMETERS • PORTABLE CONCRETE PLANTS

Supply Trade News

General

The **Northwest Engineering Company,** Chicago, has announced the removal, on May 1, of its executive and sales offices, at 28 E. Jackson boulevard, to new and larger quarters at 135 South La Salle street.

R. G. LeTourneau, Inc., Peoria, Ill., was recently awarded, by the Associated Business Papers, first place for outstanding achievement in industrial advertising. The firm was given this recognition in the machinery equipment division of the Associated Business Papers' fifth annual advertising competition. Presentation of the award, a sterling silver plaque, was made to Eugene E. Weyeneth, customer relations manager for LeTourneau, during the annual A.B.P. award dinner, which was held on May 12 at the Drake Hotel, Chicago.

Personal

J. M. P. McCraven, assistant manager of the **Texas Company,** has transferred his headquarters from New York to 1204 McCormick building, Chicago.

R. H. Daisley, vice-president and director of operations of the **Eaton Manufacturing Company,** Cleveland, Ohio, has been elected a director of the **Cleveland Hobbing Machine Company.**

George L. Fox has been appointed sales manager of the Rusta Restor division of **The Johnston & Jennings Co.,** Cleveland, Ohio, succeeding **A. B. MacTaggart,** who has retired from sales work to devote his full time to research and development.

William S. Boyce, manager of railroad sales for the **Colorado Fuel & Iron Corp.,** has been appointed general manager of railroad sales, with headquarters as before at Denver, Colo. A photograph of Mr. Boyce and a sketch of his career appeared on page 418 of the April issue.

Newell H. Orr, who has been in charge of Western Division sales for the **Colorado Fuel & Iron Corp.,** Denver, Colo., has been appointed vice-president in charge of sales for the corporation and its subsidiary companies. **F. S. Jones** has been appointed manager of commercial sales of the Western division.

The **Bethlehem Steel Company** has established a district traffic office at Sparrows Point, Md., with **Paul A. Fryer** in charge as district traffic manager, having jurisdiction over all the company's traffic matters in the Baltimore (Md.) area. Mr. Fryer, formerly district traffic manager at Chicago, is succeeded at that point by **E. D. Haugh,** district traffic manager for the Bethlehem Supply Company at Tulsa, Okla.

The **International Harvester** Company has announced the following changes in executive personnel: **Giles C. Hoyt** and

(*Continued on page* 616)

SYNTRON

CONSTRUCTION and MAINTENANCE TOOLS

"Gasoline Hammer"

PAVING BREAKERS

100% Self Contained

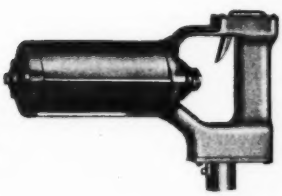
Busting Concrete,
Digging Clay, Shale,
Hardpan, etc.
Tamping, Backfill

and a host of other jobs

"Portable"

ELECTRIC HAMMERS

— for drilling, cutting, chipping concrete and masonry—scaling old paint and rust.



"Portable"

ELECTRIC DRILLS

3/16" to 1" capacity

GRINDERS and SANDERS

External Concrete Form

VIBRATORS

Setting and compacting concrete in thin wall forms, pipe forms, standards, etc.

The industrial models can be applied to bins, hoppers and chutes to keep material free-flowing.

Save You Money and Time

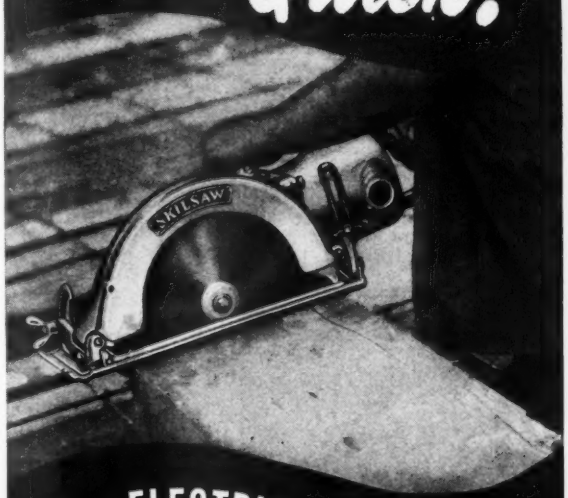
on hundreds of "nuisance" jobs.

Write for illustrated literature

SYNTRON CO.

290 Lexington Homer City, Pa.

This is the Portable SAW that CUTS 8 x 16's *Quick!*



12 IN. ELECTRIC or PNEUMATIC

SKILSAW!

● Either model cuts 4⅜ in. deep, rips or crosscuts 8-inch timbers in two quick cuts. Electric SKILSAW operates from power lines or portable generators on voltages up to 250 v. Pneumatic SKILSAW operates at maximum horsepower on 75 cu. ft. of free air under 80 to 100 lb. air pressure. Both SKILSAWS go right to the job, save time, labor, material handling . . . step up the output of your construction gangs. Ask your distributor today for a demonstration.

SKILSAW, INC.

5033-43 Elston Ave., Chicago 30, Ill.

Factory Branches in All Principal Cities

PORTABLE ELECTRIC

SKILTOOLS

MADE BY SKILSAW, INC.

(*Continued from page* 614)

Gen. Levin H. Campbell, Jr., have been elected executive vice-presidents; **Robert P. Messenger,** vice-president in charge of the Farm Implement division, becomes vice-president in charge of foreign operations, succeeding Mr. Hoyt; **Ralph C. Archer,** vice-president in charge of the Farm Tractor division, becomes vice-president in charge of the Farm Implement division; **Michael J. Graham,** assistant to the vice-president in charge of manufacturing, becomes general manager of the Farm Tractor division, succeeding Mr. Archer; **William E. Worth,** executive vice-president has retired.

C. H. Paris, whose retirement as chief engineer of the Chicago & Illinois Midland, with headquarters at Springfield, Ill., was reported in the May issue, has become chief engineer of **Track Maintenance Specialists,** a new organization specializing in complete engineering and maintenance of track.

Mr. Paris was born on April 19, 1882,

C. H. Paris

at Winona, Minn., and received his higher education at the universities of Minnesota and Wisconsin. He entered railroad service in September, 1905, as a chainman on the Northern Pacific, and served as instrumentman on the Spokane & Seattle, and as rodman on the Minneapolis, Northfield & Southern, until April, 1909, when he entered the service of the Chicago & North Western on bridge construction at Neenah, Wis. Until 1926 Mr. Paris served on the North Western as masonry inspector, assistant engineer, assistant division engineer, and acting division engineer. On March 17, 1926, he entered the service of the Chicago & Illinois Midland as chief engineer, and served in that capacity until his recent retirement.

George B. Parker, administrative assistant to the sales vice-president of the **United States Steel Supply Company** (a subsidiary of the United States Steel Corporation), at Chicago, has been promoted to general staff manager of the sales department, with the same headquarters. In his new capacity Mr. Parker will be responsible for the administration of advertising, commercial research, market development, and price policy functions of the company in its nine operating districts. **Linus E. Olson,** staff assistant to the sales vice-president, at Chicago, has been promoted to manager of the advertising division. **William A. Crane,** staff assistant to sales vice-president, has been promoted to manager of the commercial research division.

Malcolmn W. Reed, chief engineer of the **Carnegie-Illinois Steel Corporation** (a subsidiary of the **United States Steel Corporation)** has been elected engineering vice-president. A graduate of the U. S. Naval Academy, Mr. Reed entered the service of the American Steel & Wire Co. (also a subsidiary of U. S. Steel) in 1916 as a wire tester, at Worcester, Mass. He was named wire rope engineer in 1917 and foreman of the rope mill at New Haven, Conn., in 1919. After advancing to the superintendency of the New Haven plant, Mr. Reed returned to Worcester as assistant district manager in 1928, and in 1932 he was appointed chief engineer, with offices at Cleveland, Ohio. In 1933 he became assistant to the vice-president and chief engineer; in 1937 he was elected vice-president in charge of operations; and in 1939 he was appointed chief engineer of Carnegie-Illinois.

Robert Y. Barham, assistant district manager of the **American Rolling Mill Company,** Chicago, has been promoted to district manager of the recently combined Boston and New York districts, with headquarters at New York, succeeding **Wallace B. Quail,** district manager at New York, and **Donald Hogan,** district manager at Boston. Mr. Quail has been appointed manager of the central sales area, with headquarters at Middletown, Ohio, and Mr. Hogan becomes district

Robert Y. Barham

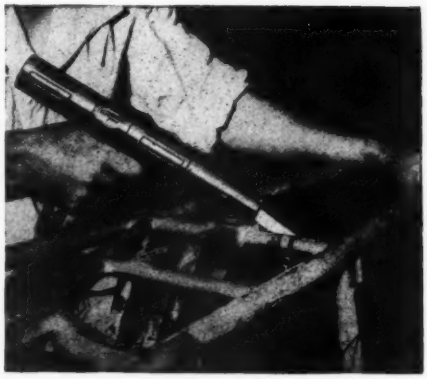
manager with headquarters at Cleveland, Ohio, effective June 1.

Mr. Barham attended the University of California, and served as an assistant division engineer on the Southern Pacific before starting his career with subsidiary companies of the American Rolling Mill Company. He served as sales manager and district manager of various Armco subsidiaries at San Francisco, Cal., Houston, Tex., and Chicago, beginning in April, 1926. He came to Chicago in 1939 as dis-

(*Continued on page* 618)

Air-Speed
Trade Mark

CUT JOB COSTS



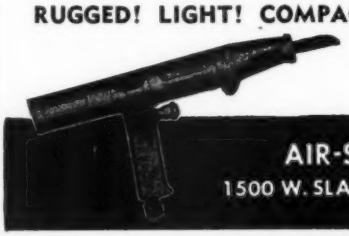
Air-Speed Saw and File eliminates slow, expensive, hand hacksawing or hand filing. Gets in awkward spaces with ease.

Speeds tough filing or sawing jobs on plastics, iron, steel, copper, aluminum, brass, wood, hard fibre and other materials. Air-Speed is designed for one hand operation. Cutting speed is variable—Simple finger pressure adjusts the exact speed required. Only two moving parts assure long life. A "must" for every mechanic.

POWERED BY AIR

RUGGED! LIGHT! COMPACT!

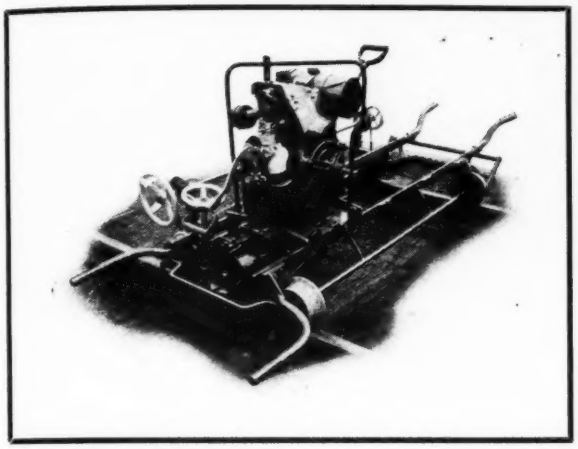
Weighs only 3½ pounds. ¼" to 1¼" stroke. Grips all hack saw blades and long, short, odd shaped files. Retails for $44.50. Immediate deliveries.
Ask Your Dealer for a Demonstration



For literature write Dept. REM-17

AIR-SPEED TOOL COMPANY
1500 W. SLAUSON AVE., LOS ANGELES 44, CALIF.

TWO GRINDERS ONE MACHINE!



the RTW *combination*
Rail Joint Cross Grinder and Surface Grinder

An ideal two purpose grinder—for slotting rail joints, removing overflowed metal from rail ends and for surface grinding. The P-38 embodies construction and operating features that spell ECONOMY in rail maintenance.

- Equipped with a grinder head for cross grinding and another for surface grinding, this machine does the work of *two separate grinders.*
- Bracket aligns machine for operation and locks positively to prevent any movement while slotting.
- Hand wheel adjusts cutting wheel to exact position for cut.
- Engine and grinders are ball bearing mounted on transverse carriage for easy movement from one rail to the other.
- Back tension on feed control automatically raises grinding wheel up and away from work immediately upon release of downward pressure. Joints can be slotted uniformly to desired depth in one cutting operation — also expedites feed for surface grinding.

Construction:

Durable but light weight — portable for quick easy handling under traffic . . . Six HP air cooled gas engine . . . inclosed gear housing . . . V belt drive from main shaft to gears . . . Insulated track wheels prevent interference with train signals.

Further information on this and other RTW machines sent on request.

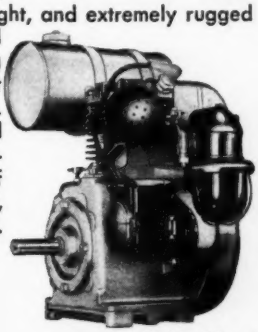
Railway Trackwork Co.

3207 KENSINGTON AVE., PHILADELPHIA 34, PA.

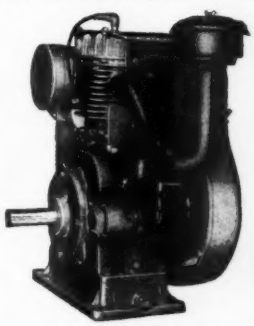
2397

It Takes
WISCONSIN Engine Power
as well as Men and Machines to Keep Rolling Stock Rolling

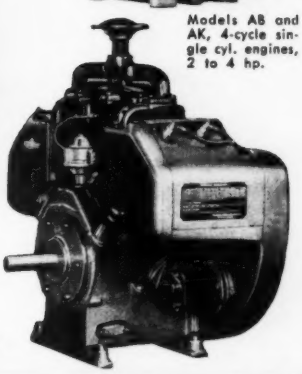
Whether the job happens to be pressure grouting the roadbed, track work with vibratory tie tampers, or shop jobs such as cleaning off old paint with pneumatic wire brushes, operating a pneumatic impact wrench, etc. . . . you will find Wisconsin Air-Cooled Engines somewhere in the background, furnishing dependable power for men and tools. Compact in design, light in weight, and extremely rugged in service, Wisconsin Air-Cooled Engines are ideal for operating a great variety of equipment within a 2 to 30 hp. power range. Trouble-free air-cooling and heavy-duty design and construction throughout are assurance of MOST H. P. HOURS OF SERVICE, with the fewest possible layups.



Models AB and AK, 4-cycle single cyl. engines, 2 to 4 hp.



Models AEH, AFH, AGH, AHH 4-cycle, single cyl., standard engines, 4 to 9 hp.



Model VE-4, V-type, 4-cyl. standard engine, 20 hp.

Most H.P. per pound

WISCONSIN MOTOR Corporation

MILWAUKEE 14, WISCONSIN, U. S. A.

World's Largest Builders of Heavy-Duty Air-Cooled Engines

LEAKY ROOF?

Playing catch with roof leaks is always a losing game . . . the score quickly adds up in wasted time as well as damage to your building, machinery and goods.

Don't put up with the high cost of roof leaks in your plant . . . have your handy man repair your roof with **Stonhard Roof Resurfacer.**

There's no heating, mixing or expensive equipment required . . . **Stonhard Roof Resurfacer** stops leaks instantly and provides years of protection on any type of roof.

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(*Continued from page* 616)

trict manager of Armco Railroad Sales, and served in that capacity until August 1, 1945, when that subsidiary was combined with the parent company. It was at that time that he became assistant district manager of the parent company in Chicago.

The **Caterpillar Tractor Co.**, Peoria, Ill., has announced the following personnel changes: **E. W. Jackson,** general parts manager, becomes director of parts and service; **M. T. Deames,** assistant general parts manager, becomes general parts manager; **W. Blackie,** vice-president and chief administrative head of the accounting and merchandise departments, has assumed administrative guidance of the traffic department; **J. H. Deaderick,** vice-president in charge of the parts, service and traffic departments, and **E. L. Murray,** credit manager of the treasury department, have resigned their positions to join **Fred Elder** of Phoenix, Ariz., as Caterpillar distributor for the greater part of Arizona. **J. M. Davies** has been appointed associate director of research in administrative charge of that department. **R. C. Williams** has been appointed assistant director of research in charge of tractor and earth-moving projects.

Obituary

Paul T. Payne, district manager of the Dearborn Chemical Company, at Indianapolis, Ind., died on April 7, at Lebanon, Ind. Mr. Payne entered the company's service 49 years ago as a laboratory technician. Later he entered the sales department, at Chicago, and served in various capacities until he was appointed manager of the Philadelphia (Pa.) office. For the past 36 years he served as district manager at Indianapolis, covering the southern and eastern parts of the United States.

Paul T. Payne

Harry C. Beaver, vice-chairman of the board of directors, and formerly president, of the Worthington Pump & Machinery Corp., Harrison, N. J., died at New York on April 2. He joined Worthington in February, 1931, as vice-president in charge of sales as well as a director and member of the board and the Executive committee. He was elected president in September, 1931, and vice-chairman of the board of directors in December, 1944.

Trade Publications

(To obtain copies of any of the publications mentioned in these columns, use postcards, page 545)

Whiting Electric Chain Hoists—The Whiting Corporation has published an eight-page bulletin describing its new line of electric chain hoists. Well illustrated with photographs and line drawings, the new bulletin analyzes the need for hoists, describes the operation and gives descriptive specifications, speeds, capacities, and prices of the various models. Several pages are devoted to an analysis of comparative handling and lifting costs, while others deal with details of construction common to all models. Information is also given concerning I-beam trolleys for Whiting electric hoists.

Diesel Engines and Power Units—The International Harvester Company, Industrial Power Division, has announced two new eight-page Diesel engine pamphlets which contain complete specifications of the UD-14A and UD-18A Diesel engines and power units, together with information on such items as bearing areas, moments of inertia, dimensions, and material specifications. In addition, the pamphlets include performance charts, power curves, torque curves, and an analysis of fuel consumption at various load ratings and with engine under governor regulation. Equipment combinations for a wide range of applications are graphically illustrated in each pamphlet.

Simplex Util-A-Tool—Templeton, Kenley & Co., has published a four-page illustrated bulletin dealing with the company's Simplex Util-A-Tool, which is designed to function as a many-purpose tool on a wide range of maintenance applications. The center spread of the bulletin includes ten photographs of this tool in use, and the back page carries details of the company's line of jacks. Specification charts and price listings are included.

Portable Drinking Fountain—The Dobbins Manufacturing Company has issued a new four-page folder which describes the advantages, applications, and construction of the Dobbins sanitary portable drinking fountain and its accessories—carrying strap, salt tablet dispenser, spill cup, and three-way mounting bracket. The folder is well supplied with photographs showing the fountain being used by construction and maintenance crews. A price list and specifications are included.

Koppers Bituplastic Coating — The Wailes Dove-Hermiston Corporation (a subsidiary of the Koppers Company, Inc.) has published a four-page, two-color pamphlet describing the characteristics and uses of Koppers Bituplastic—a plastic protective coating for waterproofing and vapor-sealing metal, concrete, or masonry surfaces. The pamphlet includes data on five types of Bituplastic, special recommendations for the use of each type, and details of coverage, methods of application, and drying times.

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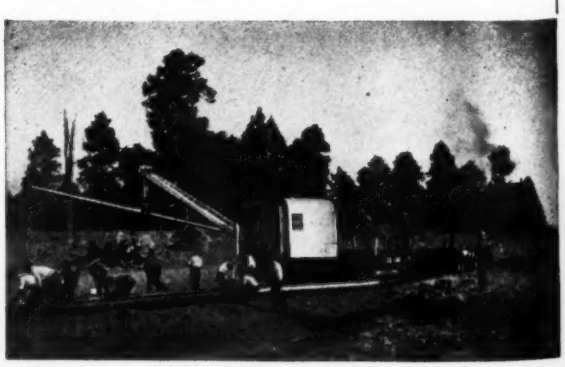

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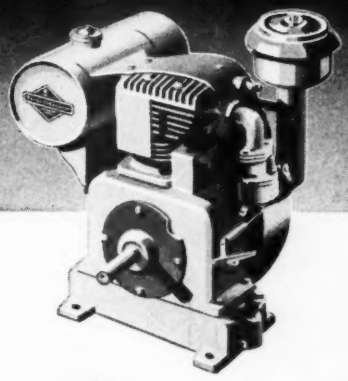

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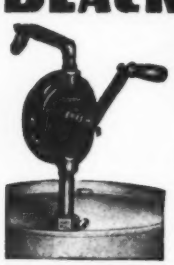

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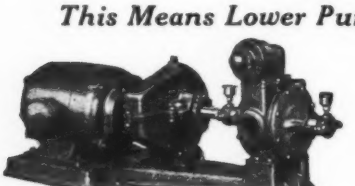

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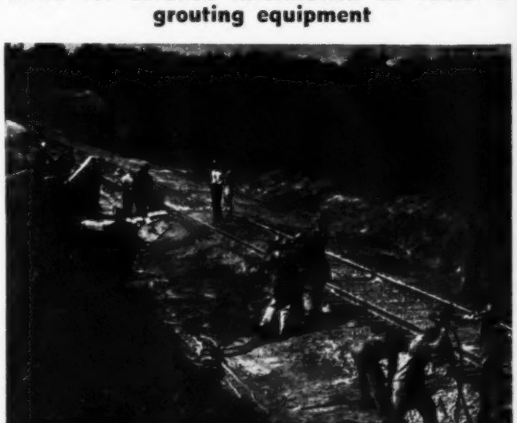

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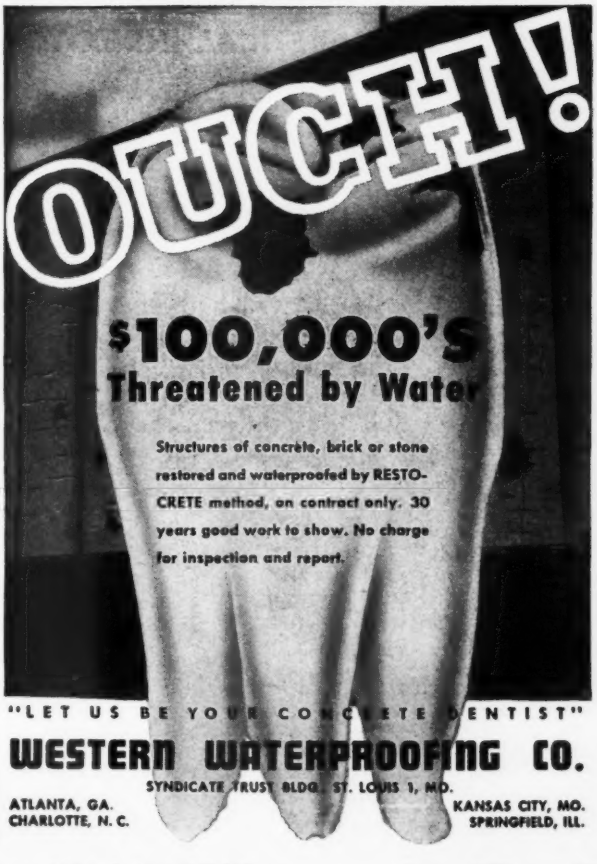
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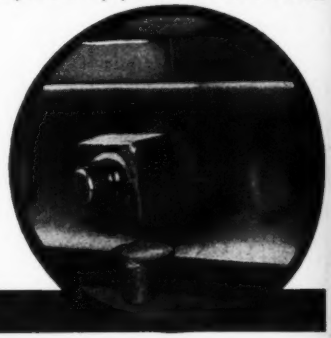

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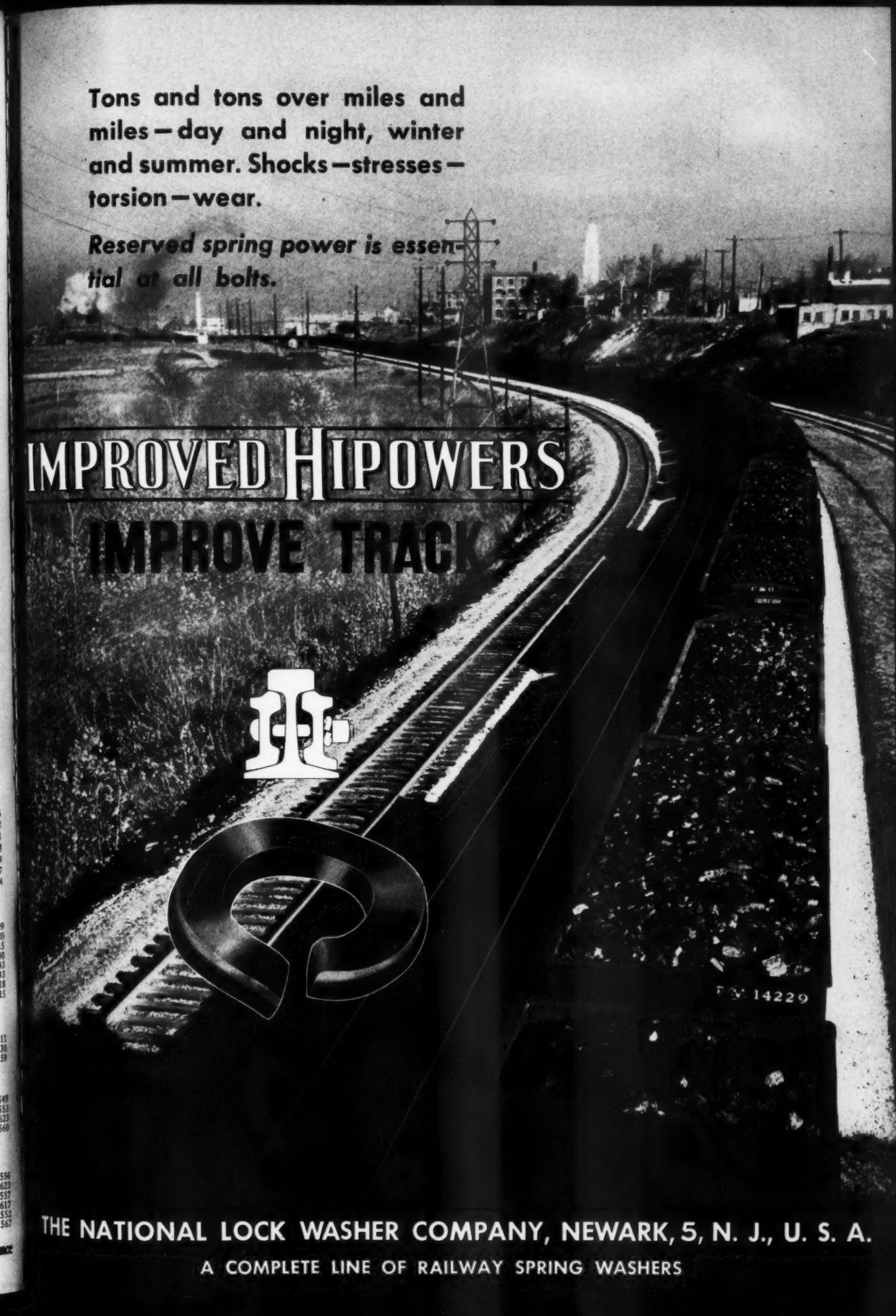
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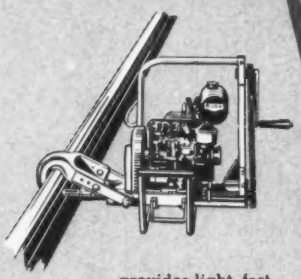

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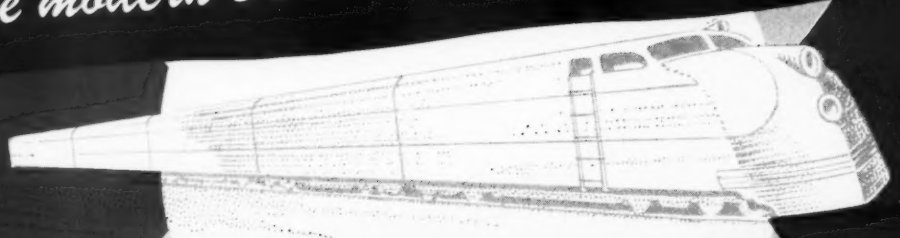

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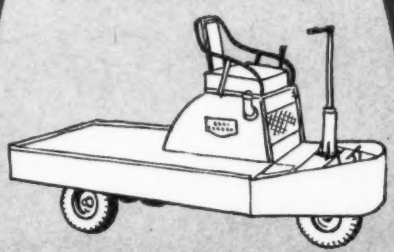

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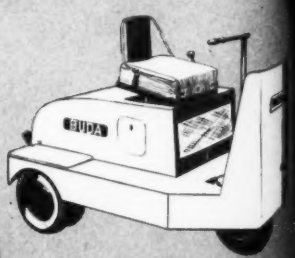

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